SECTION 4:

Lifelong Learning Skills

LESSON 1: “Where Has All the Money Gone?”
   A Lesson in Capital Spending ................................. Jackie Taylor-Pendergrass L-1

LESSON 2: Rewarding Responsibility and Accountability:
   Outstanding Entrepreneurs ................................. Jackie Taylor-Pendergrass L-7

LESSON 3: Self-Motivation Signs ................................. Beverly Dean L-11

LESSON 4: Determining Needs vs. Wants ................. Carole Cheatwood L-13

LESSON 5: Packaging Your Assets ............................. Micki Hendrix L-15

LESSON 6: Entrepreneurship: How to Begin ................... Gloria Rolfe L-17

LESSON 7: Statistical Sampling .................................. George Bott L-21

LESSON 8: Researching a Business ............................. Lisa Coy L-29

LESSON 9: Business and Industry
   Resource Book ........................................ Kristi Matthews, Mickie Phillips, Jake Sharp, Tomi Thompson L-31

LESSON 10: Building Memories ................................. Jackie Taylor-Pendergrass L-33

LESSON 11: “Where In the World Is…?” ........................ Glenda Turner L-39

LESSON 12: Comparative Evaluation of Different Makes of Flashlight Batteries .......... George Bott L-41

LESSON 13: Increased Productivity ............................. Ernest Pounds L-47

LESSON 14: Improved Technology Improves Work Efforts .................. Ernest Pounds L-49

LESSON 15: Diagnosing a Car Non-Starting Problem .................. George Bott L-51

LESSON 16: Searching for Dream Homes on the Internet ................... Carole Cheatwood L-61
The following learning activities also include Lifelong Learning Skills

**Located in the Communication Skills section:**

LESSON 1: Realtor Role-Play ................................................................. C-1
LESSON 3: Exploring Occupations While Improving English and Spelling ........................................... C-5
LESSON 4: Encouraging Others in Class, in the Workplace, in the Home ........................................... C-9
LESSON 5: Thank You for Your Purchase .............................................. C-11
LESSON 6: Entrepreneurship: Is It for Me? ............................................ C-13
LESSON 7: Entrepreneurship: What Business Am I In? ......................................................... C-17
LESSON 8: Entrepreneurship: Will It Work? ............................................... C-21
LESSON 10: Students as Teachers ......................................................... C-25
LESSON 11: Observing Your Surroundings ................................................ C-27

**Located in the Decision-Making Skills section:**

LESSON 2: “And By What Name Shall This Business Be Known?” .................................................. D-3
LESSON 3: Setting Up for Business ......................................................... D-5
LESSON 4: “Going Out of Business” Successfully! .................................................. D-9
LESSON 5: Selecting a Career Path ......................................................... D-15
LESSON 6: How to Prepare for the First Day of Employment ........................................ D-17
LESSON 7: My Paycheck Amount—Computing Taxes and Withholdings ........................................ D-21
LESSON 10: Learning to Operate a Cash Register ................................................ D-27
LESSON 12: Accounting the Monopoly Way .............................................. D-31
LESSON 16: Industrial Measurement: Using the Industrial Ruler .............................................. D-49
LESSON 18: Industrial Measurement: Using Micrometers in the Workplace ................................. D-61
LESSON 19: Steps of Problem Solving ..................................................... D-67
LESSON 20: How to Keep a Job ............................................................... D-71
LESSON 22: Personal Information Card for a Job Search .................................................. D-75
LESSON 24: Entrepreneurship: Planning to Stay in Business ........................................ D-81

**Located in the Interpersonal Skills section:**

LESSON 4: Announcing Who We Are ..................................................... I-9
LESSON 6: Making Birthday Calendars for Community Organizations and Businesses ............... I-15
LESSON 7: Communicating at Work: Putting Together a Team ................................................ I-17
LESSON 8: Communicating at Work: Developing a New Product ................................................ I-21
LESSON 1

“Where Has All The Money Gone?” A Lesson In Capital Spending

Learners are walked through the process of balancing books by determining monthly totals of their small business spending. Learners then are introduced to the concept of in-kind resources, and recalculate expenses including all in-kind that was donated to their grant project.

Learning Objective
- Learners will compute the spending involved when obtaining the capital necessary to open for business with 100% accuracy.
- Learners will calculate the dollar value of donated time, resources, and materials with 100% accuracy.
- Learners will indicate their understanding of the “big picture” of business operations by reflecting upon what they’ve learned and making long-term predictions about the monthly balance sheets of their small business operations.

Work-Based Skills

EFF Skills: Lifelong Learning Skills: learns through research, reflect and evaluate; Decision Making Skills: use math to solve problems and communicate.

KSAs: Accurately performs work; Follows instructions; Knows standard procedures.

SCANS: Basic Skills: arithmetic/mathematics; Information Skills: acquires and evaluates information, organizes and maintains information, interprets and communicates information; Personal Qualities: self-esteem, self-management.

Subjects
- Life skills
- Mathematics
- Consumer education
- Employability

Activity Description
1. Background. Opening a small business involves obtaining a vast array of capital resources, from office and cleaning supplies and equipment-specific capital, to the leasing of a location, marketing, and company vehicle expenses. Part of being a successful small business owner involves keeping accurate records of company spending.

2. Taking Stock of Where We Are: Calculating Funds Expended
   - Give each learner one blank inventory journal per month of business operation (Handout 1). Either on an overhead transparency or on a sample sheet to pass around, show the learners a sample inventory journal (Handout 2). Explain that each inventory sheet represents spending for a one-month period. The month the inventory is recorded is written in the blank at the top. The amount of money in the account with which to purchase inventory is written in the blank.

Materials and Resources
- Handout 1: Blank Monthly Inventory Sheet
- Handout 2: Sample Inventory Sheet
- Inventory journal published in the Business Tax Record Book available from H + R Block
- In-kind sheets obtained from a non-profit organization such as a school
- Monthly total in-kind sheets

Families First is the Tennessee program to provide training for those welfare recipients who lack basic education skills. While learners do work toward a GED, emphasis in these classes is shifting toward the knowledge, skills, and attitudes learners need to acquire and keep a good job.
“Beginning Physical Inventory.” In the left-hand column, each day of the month is listed. In the next column titled “description,” the place the inventory was purchased is written. The cost of the purchase is written in the following column, and if any inventory was returned, the amount of the return is written in the last column. This process is repeated for all spending that occurred in the specified month.

- At the bottom of the inventory journal, all spending is totaled for the month, as well as any returns. The cost is subtracted from the amount written in the blank “Beginning Physical Inventory,” any returns are added, and a new total is written in at the bottom blank called “Ending Physical Inventory” (see sample inventory journal). The ending physical inventory becomes the beginning physical inventory for the next month, and the entire process is repeated for all succeeding months.

- On the board, write the beginning physical inventory for the first month. Then write the name of the first location at which grant money was spent, and write the amount spent. Wait until all learners have subtracted it from the grant total. Encourage learners to help others around them without giving them the answer, but by showing them how to do it. As a class, have the learners give you their answers. When everyone comes up with the correct answer, write the next receipted purchase on the board. Since the learners’ math skills are at various levels, you may write the names of all the locations of purchase on the board for the quicker math learners, but do not write all the spending amounts at once. Some learners tend to get much further ahead than others, and suddenly the class will cease to work together as a whole.
- Once all spending has been subtracted from the total grant amount, have the learners graph their results. Which month incurred the highest spending? What was happening that month that may have affected spending? Which month incurred the lowest spending? Why was spending down that month? Discuss their results.

3. Taking Stock of Where We Are: Calculating In-Kind Expenses
- Hand out blank copies of your school system’s in-kind sheets. Explain to the learners that money comes in all forms, not just cash, but through the donation of time, materials, and resources. By providing the appropriate information, have the learners calculate all in-kind that was donated towards their project. Have the learners determine totals for each month of in-kind.
- Once all in-kind is calculated and totals are determined, have the learners graph their results. Which month had the largest in-kind donation? Which month had the lowest in-kind donation? What was occurring those months that may have affected donations?

4. Making Inferences Based on Reflections
- How do the in-kind donations compare to the monthly grant spending? Are the monthly peaks and lows similar or different? Why? If your small business were funded through a loan from a bank instead of from a grant, how
much more money would you have to request from the bank? Why is this?

How would you predict long term small business spending? Would it increase? Decrease? Would there be any seasonal fluctuations in spending? Why?

Assessment
The first two objectives are formally assessed—did the learner complete his/her calculations with 100% accuracy? The third objective is assessed formally and informally: the learner completed graphs plotting his/her data and explained his/her results. The questions asked of the learners at the end of the activity may be asked orally, or you may ask for written responses from them.

Practitioner Reflection
Although eye witness to all of the inventory that entered and exited their photography studio, several learners expressed a lack of understanding regarding actual spending of the $2,000 in Action Research Grant funds allocated to their class for the opening of a photography studio. It seemed they were having trouble understanding where all the money had gone! It never occurred to me before that this would pose a problem for them, since the group of learners that started this project remained in my class for the duration of it and were witness to, and many times assisted in, the spending of the grant funds. Imagine their surprise the day of the grand opening of their portrait studio when I told them that all of our $2000 had been spent and any more money we needed to spend could come only from the profits they made selling portraits! In an attempt to bring their understanding of small business ownership full circle, I developed this learning activity.

If I were to repeat this activity another time, I would initiate this activity at the beginning of the project and have the activity be an ongoing one; the learners would keep their own tally sheets in their ring binder, subtracting receipts as expenses are incurred. This way they would know exactly where we stood financially at any given point during the project. I would also have learners calculate mileage on my vehicle, which was the company car, and determine the additional wear and tear placed upon it as a result of its use.
## Sample Inventory Sheet

Month of ________________________________

Beginning Physical Inventory ________________________________

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
<th>Cost</th>
<th>Returns/Allowances</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL**

Ending Physical Inventory ________________________________
# Sample Inventory Sheet

Month of: January  
Beginning Physical Inventory: $2,000.00

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
<th>Cost</th>
<th>Returns/Allowances</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Staples</td>
<td>67.31</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Business License</td>
<td>20.00</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Studio Lights</td>
<td>575.00</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Travel to Lebanon</td>
<td>48.54</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Wal-Mart</td>
<td>107.83</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>$818.68</strong></td>
<td></td>
</tr>
</tbody>
</table>

Ending Physical Inventory: $1,181.32
Rewarding Responsibility and Accountability: Outstanding Entrepreneurs

Learners are given points daily based upon their participation and efforts in attempting to open a small business, in this case, a photo studio. Learners choose which tasks they want to complete and ultimately decide how many points they wish to score. Weekly, monthly, and seasonal awards are granted to learners who have earned the highest points.

Learning Objective
• Learners will take increasingly greater responsibility for their learning as indicated by taking part in the point system and accumulating a set number of points.
• Learners will take ownership of their small business by demonstrating increased self-initiative in determining their own daily business goals.

Activity Description
The action research project in which my class participated involved the opening and operating of a photography studio. Opening a small business is an intricate process involving literally hundreds of steps. Although being able to open the doors for business makes all the effort worthwhile, I needed to do something to provide an ongoing incentive for all of the multitude of steps my learners were going to have to make, and to illustrate the grandeur of the work they had accomplished. I initiated the small business project with a few lessons over self-esteem, marketing research concerning what business opportunities were open to us, and a field trip to our local Small Business Development Center in Chattanooga. But the point system itself was an ongoing process initiated towards the beginning of our project that lasted the duration of our small business project, providing documentation of what steps were necessary in implementing a small business, and who had borne the weight of that responsibility. We carried out our project daily by reviewing what tasks needed to be accomplished that day. Learners choose any tasks.

Materials and Resources
Practitioners should prepare job description handouts in advance, as well as the table on which learners record individual points and the bulletin board that will display the current information and award winners. Practitioners should also prepare a syllabus on the project that is going to be completed, illustrating topics week-by-week to clear up any confusion and encourage participation.

Families First is the Tennessee program to provide training for those welfare recipients who lack basic education skills. While learners do work toward a GED, emphasis in these classes is shifting toward the knowledge, skills, and attitudes learners need to acquire and keep a good job.
they wished to complete, ultimately taking responsibility for their learning by deciding how many points they wished to score. As the process evolved, learners began taking ownership of the business by taking the initiative to complete unexpected or remaining tasks at hand, deciding for themselves what needed to be accomplished on which day.

To Initiate the Point System:
1. Divide the class into teams or partners. Seat them together with their team or partner around a large table for group discussion. Ask them if they were playing ball, what actions of their team members would make them upset during a game? (Answers will vary, but will reflect how the lack of efforts by one team member can hurt the whole team, potentially causing a loss for that team.)

2. Discuss and list on the board expectations learners would have of their fellow ball team members. Hand out copies of the project’s job descriptions, point system rules, and a sample record chart. Discuss how the qualities of being a ball team member relate to being a team member or partner when opening a small business.

3. Explain point system rules. (See below for rules.) Have teams brainstorm a list of steps they believe must be accomplished in order to start a small business. Time the brainstorm—5 minutes. The point of the learners’ brainstorming activity is to get the learners into the mode of thinking in terms of “What needs to be done next?” The teacher circulates among the teams to answer questions.

4. Review the learners’ lists as a class. Have the learners keep their lists as a sort of brainstorm sheet to add to as new ideas come to mind.

5. Give learners the first daily list (pre-prepared) on the blackboard of what needs to be done. On a “first come, first served” basis, teams can sign up for duties by writing their names next to the task on the board.

Operationalizing the Point System:
1. Make a poster of the knowledge, skills, and attitudes (KSAs) necessary (see below) to acquire and keep a job as well as job responsibilities applicable to business operations.

2. Make a chart with the learners’ names on one axis and the dates on the other axis.

3. Daily, as each of the job responsibilities and KSAs are achieved, put the number of points earned by each learner’s name. Each of the KSAs and job responsibilities are worth one point.

4. On the blackboard, list additional duties that do not fall within the realm of anybody’s job descriptions. Prioritize the duties according to which week each needs to be accomplished. Only list the duties that can be achieved within one day’s time on the blackboard. Extra duties should be worth more than daily duties to provide an incentive for learners to become self-motivating. Extra duty points are awarded only when daily duties are completed.
Assessment

Learners should keep daily logs of their business activities in a journal for the practitioner to review. The first objective has been met if the learners earn points on a weekly, monthly, and seasonal basis. The points are an assessment of their efforts towards achieving a common goal. Showing initiative by taking on extra jobs and seeing jobs

KSAs and Job Responsibilities Poster

- Works well with others
- Cooperates
- Exhibits teamwork
- Creative
- Self-motivating
- Takes initiative
- Works on typing skills daily—Mavis Beacon Teaches Typing program
- Uses proper phone etiquette
- Uses the computer when necessary
- Asks well-formed questions

Loss of Points

Points will only be lost when the learner is absent from class. Absences are only excused when an emergency arises and documentation of that emergency is brought in.

1. Unexcused absences deduct points from weekly score.
2. Any employee who scores into the negative domain is hypothetically “fired.”
3. Any “fired” employee may elevate her status by becoming the company’s “volunteer,” earning points by completing KSAs and acting as “gopher” to all business employees.
4. The volunteer will continue to maintain supportive duties until such time that her points re-enter the “positive” domain.
5. Once a volunteer re-enters the positive domain, she may fill out an application for employment and turn in a typed resume.
6. If the application and resume “pass” her peers’ inspections, the volunteer will qualify for an interview.
7. To succeed at the interview conducted by her peers, the applicant must express what she can contribute to the success of the business, articulate herself clearly, and dress for success!

Awards

Weekly: Career Person of the Week
- Picture is posted on the bulletin board
- Certificate of Achievement
- Choice of three products from school store

Monthly: Partner of the Month
- Portrait on a plaque at place of business
- Portrait on classroom bulletin board
- Certificate of Achievement
- Choice of five products from school store
- Special employee of the month parking

End-of-Project: Entrepreneur of the Year
- Trophy or plaque to take home
- Portrait on bulletin board
- Newspaper recognition
- $50 gift certificate at Wal-Mart
that need to be done but are not listed are good indications that learners are beginning to feel like they “own” the business.

Practitioner Reflection
Several learners had said they would like to learn how to make money without always working for somebody else. They were curious to discover how to become “your own boss.” As part of the work place, employees must take responsibility for certain tasks, and they are accountable for the actions those responsibilities demand. Ironically, despite their interest in becoming “your own boss,” I had difficulty in the beginning of our project encouraging the learners to show up for class and participate in the tasks that lie ahead. When I spoke to learners individually, they each expressed concerns of the class’ ability, as a whole, to make this project work. In order to make the overwhelming task of opening a small business possible and easier to manage, I wrote up the job descriptions and implemented this point system.

Initiating the point system on the first day took more time and explanation than on following days, which only consisted of reviewing the daily tasks and allowing the learners to choose which ones they would be responsible for. The key to this process is providing ongoing feedback, and I found it difficult, considering the more pressing tasks at hand, to award the Career Woman of the Week in a timely manner. If I were to do this again, I would consider providing only the monthly and seasonal incentives. Instead of providing a weekly award, which is time consuming and fund depleting, I would provide levels of achievement that anyone in the class could work towards if they so desired. For example, I would give the learners a set number of points that, when reached, would earn them a new status in the business like “associate,” “manager,” and “partner.” A career ladder could be mapped on the classroom wall, and photographs of the learners could be moved along the ladder reflecting their newly earned career status.

I would also precede this lesson with more teamwork, confidence, and self-esteem building lessons than I did, so that the learners could develop a greater sense of confidence in themselves and in their “business partners’” abilities and talents.
Self-Motivation Signs

By browsing through various resources containing motivational sayings, proverbs, and verses, learners reflect upon individual motivational needs and create signs which serve as “reminders” to cater to those needs.

Learning Objective
Learners will identify specific areas with which they desire motivational assistance, and will produce signs that solicit those behaviors for display in their homes.

Work-Based Skills
EFF Skills: Lifelong Learning Skills: reflect and evaluate; Communication Skills: read with understanding.

KSAs: Follows instructions; Reads work related text.

SCANS: Basic Skills: reading; Personal Qualities: self-esteem, self-management.

Subjects
• Learner produced materials
• Life skills
• Literature

Activity Description
1. The day before the activity, ask learners to bring to class any books, pamphlets, calendars, etc. that have motivational sayings. The teacher should bring these to share as well. If learners have ready access to the Internet, they can explore the Websites listed in “Materials and Resources.” Alternatively, the practitioner could visit the sites ahead of time and download appropriate pages for the learners’ use in class.

2. At the beginning of class show post-it-notes, magnets, signs, and other motivational sayings from the practitioner’s collection and any brought in by learners.

3. Invite learners to discuss the terms “motivation” and “attitude.” Discuss negative feelings about education and work and what effect concentrating on more positive perceptions or images might bring.

4. Each learner is to make signs containing sayings that have some personal connection or meaning to their current life situation. Their choices should contain thoughts that encourage, inspire, or challenge them. The signs learners create can go on refrigerators, mirrors, nightstands, etc.

5. Distribute sources for handouts: books, pamphlets, day-by-day calendars, downloaded Internet pages, etc. Suggest learners take their time and carefully choose three sayings that inspire, motivate, encourage or challenge them.

6. Distribute supplies for making the signs: brightly colored index cards, markers, glitter, etc. Encourage learners to create signs to display at home that will provide inspiration and encouragement when they see them.

Families First is the Tennessee program to provide training for those welfare recipients who lack basic education skills. While learners do work toward a GED, emphasis in these classes is shifting toward the knowledge, skills, and attitudes learners need to acquire and keep a good job.
Setting
This is a group of approximately 8–10 Families First learners who come to class five days a week from 8:00 AM – 12:00 NOON.

Assessment
To evaluate the effectiveness of this lesson, learners should be able to select motivational literature suited to their needs, and create signs displaying those quotes they have selected. Observe how much time the learners take with the activity. Also, in the future ask them if the signs have helped to boost their outlook.

Practitioner Reflection
We hit a slump in our classroom. Several of my learners experienced discouragements at about the same time through negative experiences at work, classmates having received their GED and moving on, losing a friend, etc. I hoped that through this activity, these little words of wisdom they see often could work subliminally to encourage, inspire, or challenge their ways of thinking.

The learners really enjoyed this activity. The discussion itself seemed to be very beneficial for venting frustrations and concerns. Most of the learners took their time choosing sayings related to them. A few seemed to want to focus more on words of wisdom about child rearing rather than job skills. Over all, I feel this was a very effective activity.
Determining Needs Vs. Wants

After a discussion on needs vs. wants in home buying, learners write a detailed description of their dream home. The learners then categorize each of their listed home features as a need or a want.

Learning Objective
Students will be able to discriminate between a need and a want in home buying in a written exercise following this discussion.

Work-Based Skills
EFF Skills: Lifelong Learning Skills: reflect and evaluate; Communication Skills: read with understanding, convey ideas in writing, speak so others can understand, listen actively; Decision Making Skills: plan.

KSAs: Follows instructions; reads work related text; Talks with respect; Listens for understanding; Quality in the workplace.

SCANS: Basic Skills: reading, writing, speaking, listening; Personal Qualities: self-esteem, self-management; Thinking Skills: seeing things in the mind’s eye.

Subjects
• Consumer education
• Critical thinking,
• Job skills
• Writing skills

Activity Description
1. Learners write for 15 minutes in their journal describing their dream home in as much detail as possible.

2. Ask for volunteers to read their descriptions aloud. (The practitioner may collect writings and randomly read aloud if the group does not normally volunteer.)

3. Distribute a copy of the local Home Guide. Ask learners to look through the guide to see if they can find their “dream home.” If they find their dream home, ask them to make an enlarged copy of it on the copy machine.

4. Discuss the differences between “needs” and “wants.” If you need to, look in a dictionary for definitions and write on the board. Discuss how employers need their employees to be able to determine needs vs. wants to maintain cost effectiveness. Also, explain that sometimes we have to make decisions to determine what is really a “necessity” and what is a “would like to have” item. Make a list on the board of needs and wants. The “needs” list might include nutritious food, clothing, housing, transportation, water, etc. The “wants” list might include candy, a swimming pool, a sport utility vehicle, designer clothes, a cell phone, and so on. The discussion as to which list to put an item on will help to solidify the difference between needs and wants.

Project
This learning activity was part of the project sponsored by the Fannie Mae Foundation to prepare Families First recipients for homeownership and an action research grant given by the Tennessee Department of Human Services to create work-focused Families First classrooms.

This activity was the first of three in this series:
1. Determining Needs vs. Wants
2. Realtor Role-Play
3. Searching for Dream Homes on the Internet

Materials and Resources
1. Paper and pencil for each learner
2. White board and dry erase markers
3. Locally distributed Home Guides (free locally each month at convenience stores and grocery stores)

Learner Level
Grade levels 6.0-12.9

Families First is the Tennessee program to provide training for those welfare recipients who lack basic education skills. While learners do work toward a GED, emphasis in these classes is shifting toward the knowledge, skills, and attitudes learners need to acquire and keep a good job.
5. On clean sheets of paper folded lengthwise, learners write the word “Needs” at the top of one side and the word “Wants” at the top on the other side of the paper. Learners then categorize the features of their “Dream Home” in the “needs” column or the “wants” column. They may use either the home they wrote about in their journals or the one they found a picture of in the Home Guide.

6. Divide the class into groups of two or three and ask each other to justify the choices they made on their lists. If they cannot adequately justify an item in the “needs” column, then they should be asked to move it to the “wants” column. Have learners review their revised lists.

Assessment
Learners will have compiled a more accurate list of needs and wants. They will use this list in the following lessons “Realtor Role-Play” and “Searching for Dream Homes on the Internet.”

Practitioner Reflection
This activity involved all learners as they practiced skills necessary for the workplace. The learners explored the idea of living in a home of their own and they experienced some of the kinds of decisions they would have to make before deciding on what kind of home would best meet their needs. My class enjoyed looking through the home guides because they began to realize that all homes are not as expensive as they had first thought. Some learners were even able to realize the need to be able to discriminate between needs and wants when making purchases other than a home.
Packaging Your Assets

This activity is an on-going activity in which there is class discussion, individual reflection and evaluation of abilities, direct instruction, journal writing, and resume/portfolio development. Learners consciously practice using knowledge, skills, and attitudes named as KSAs as well as specific information and communications technology in the classroom as a part of classroom routine. The instructor must recognize, reinforce, and reward the skills as they are exhibited. Learners are instructed to write daily journals of their work-related activities, noting new skills mastered and attitudes addressed in the activities. Later, learners summarize all skills mastered.

Learning Objective
- Learners will adopt, as a part of their conscious daily routine, knowledge, skills, and attitudes (KSAs) commonly used in the workplace.
- Learners will package their mastery of these skills in a useful form as a part of their portfolio to be used when job seeking.
- Learners will reflect an increase in self-confidence as these skills are identified.

Work-Based Skills
EFF Skills: Lifelong Learning Skills: reflect and evaluate, use information and communications technology; Interpersonal Skills: advocate and influence; Communications Skills: convey ideas in writing; Decision Making Skills: plan.

KSAs: Quality in the workplace.

SCANS: Basic Skills: writing; Personal Qualities: self-esteem, self-management; Thinking Skills: seeing things in the mind’s eye; Information Skills: uses computers to process information; Technology Skills: selects technology, applies technology to tasks; Interpersonal Skills: exercises leadership.

Subjects
- Employability
- Life skills
- Resumes—personal
- Technology
- Work environment
- Writing skills

Activity Description
This activity is not one for which we set time aside for to formal instruction, but rather a procedure that is in place all the time and applied as the opportunity arises. As I discover materials that are applicable on the Internet, I bring in copies for the learners. There are many helpful websites that consider skills needed on the job. (See “Materials and Resources” section for two samples. Practitioner can also go to the msn news web page every morning. There is usually something job-related on there.)

Families First is the Tennessee program to provide training for those welfare recipients who lack basic education skills. While learners do work toward a GED, emphasis in these classes is shifting toward the knowledge, skills, and attitudes learners need to acquire and keep a good job.

Micki Hendrix
McNairy County
Adult Learning and Job Training Center

Project
This activity is part of larger project in which learners compose a portfolio to be used while job seeking

Materials and Resources
- Handouts: descriptions of skills, attitudes, knowledge to be considered
- Journal: for individual documentation of skills mastered
- Internet resources: job descriptions with skills required. Two samples of such sites are:
  - http://content.careers.msn.com/_int_htg_questions.html
- Other media: job descriptions with skills required

Learner Level
Basic skills, grade levels 5.0-8.9

Learner Grouping
Individual, Whole class
**Time Needed**
Ongoing—Activity is more of a procedure or a way we operate day-to-day than a lesson that we schedule into our day.

**Setting**
This activity occurs within a Families First ABE/workforce readiness class that meets 5 days per week, 4 hours per day. Average attendance is 8-10 learners.

The learners have a checklist of knowledge, skills, and attitudes (KSAs) needed for employment. The KSAs are also posted prominently on the wall of our classroom. (See the appendix for a complete listing of the KSAs.) In our class, we also have a list of common tasks or specific skills in the workplace, including proper telephone techniques, operating a copy machine, operating a fax machine. We use real-life situations that arise in the lives of the learners to apply the skills.

*Example:* The participants are required to use the fax machine to communicate to DHS for absence or to communicate to a doctor’s office, etc. When participants have completed the fax successfully several times, the skill is added to their list of skills. Participants also write about the experience in their journals. Participants also teach the skill to new learners to cement the learning. (The same process applies to other skills).

The KSAs are not as easily assessed as hard skills, but a practitioner can certainly observe if a learner gets along well with others, or if the learner follows instructions. I observe the learners in each situation in the classroom. I watch to see if they follow instructions, cooperate with others, accurately perform work, etc. The main emphasis is to constantly remind them that the KSAs are the big ticket to being successful in the workplace and in life. By continually mentioning and discussing the KSAs and by connecting them to learners' behaviors, the practitioner can be assured the learners have a good understanding of their significance. Learners include KSAs they believe they have mastered in their resumes.

**Assessment**
The practitioner awards mastery certificates in hard skill areas. The learners have a checklist on their portfolio of knowledge, skills, and attitudes including both the KSAs and these hard skills, and the skills are checked on the list as they are demonstrated. (Each practitioner decides the additional skills he/she chooses to include on the checklist.) Also, the practitioner assesses the learner by the finished portfolio and confidence of the learner. Change in behavior is a gradual process, but keeping learners aware of the desired KSAs by making the recognition explicit greatly speeds up the process and keeps it in the forefront of learners' consciousness.

**Practitioner Reflection**
Learners need to develop specific skills for employability and the ability to recognize the skills. The learners also need to become self-advocates, learning to present their skills confidently in a job interview. I hope that this activity will help each of my learners find his/her special abilities and propel him/her to promote these abilities.

In teaching this activity again, I would involve the learners in more of the teaching of the skills. (Anytime one teaches a skill, the skill is reinforced). This activity is easily transferred to real-life situations since the learners' goals are to seek careers. Skills are extremely important, especially with little or no work history.
Entrepreneurship: How to Begin

This learning activity will introduce the idea of entrepreneurship and starting one’s own business. Through the experiences that a guest speaker brings and their own discussion and research, learners will begin to define a business plan and understand the parts of a business plan.

Learning Objective
• Learners will understand the concept of entrepreneurship.
• Learners will examine and be able to identify the rudiments of a business plan.
• Learners will locate and use resources about business plans on Internet.

Work-Based Skills
EFF Skills: Lifelong Learning Skills: learn through research, use information and communications technology; Communication Skills: listen actively.

KSAs: Accurately performs work, Follows instructions; Knows standard procedures; Listens for understanding; Follows instructions.

SCANS: Basic Skills: listening; Information Skills: uses computers to process information, Acquires and evaluates information, organizes and maintains information, interprets and communicates information; Technology Skills: selects technology, applies technology to tasks;

Subjects
• Critical thinking
• Employability
• Job skills
• Life skills
• Listening skills

Activity Description
This lesson was composed of two parts on two successive days: (1) a discussion to introduce the idea of entrepreneurship and the importance of a business plan, and (2) a guest speaker who spoke on the content of and importance of business plans to the success of an entrepreneurial business.

Discussion:
1. Begin a general class discussion on working and what kinds of jobs the learners would like to have. If it does not come up in the discussion, ask learners if anyone has ever thought of owning his/her own business. Allow time for this discussion to develop.

2. Define entrepreneurship as starting a business and assuming the risk for organizing and running that business venture. Again, let the discussion develop. Make sure the “risk” involved is part of the discussion.

3. Ask for suggestions as to how the entrepreneur can minimize the “risk” factor. Introduce the idea of good planning and leaving less to chance.

Materials and Resources
• A copy of an actual business plan from your Small Business Administration state or local office
• Resnik, P. (1988). Everything You Need to Know

Families First is the Tennessee program to provide training for those welfare recipients who lack basic education skills. While learners do work toward a GED, emphasis in these classes is shifting toward the knowledge, skills, and attitudes learners need to acquire and keep a good job.
4. Ask the learners what they think might be contained in a business plan that would help the entrepreneur minimize risk.

5. Introduce the idea of doing research to find out the parts of a business plan. Let the learners know that there are many different ideas of how to write a business plan, and they are going to try to synthesize what several sources say to determine if they can agree on a basic list of steps for writing in a business plan. Let learners work with partners. (One group can have three learners if there are an uneven number of people in the class.) Have each group consult a different reference from the “Materials and Resources” section listed above or other references you may have procured. Have learners list the sections of a business plan as found in their reference with a short definition of what would be contained in that section. Allow about 15-20 minutes for this activity.

6. Help the learners synthesize the information they have gleaned, using the blackboard. Try to come to a simplified understanding of what is contained in each of the parts of a business plan that they agree on.

7. Take time to answer questions about a business plan.

8. Give learners copies of an actual business plan that you have obtained from the Small Business Administration. If they are familiar with the particular business or with businesses of that same type, the plan will be of more interest and benefit to the learners.

9. Look at this plan to recognize where the information in the business plan they synthesized is located.

The following web sites were also especially helpful:

- U.S. Small Business Administration
  —http://www.sba.gov/starting/indexbusplans.html
  —http://www.sba.gov/starting/indexsteps.html

- St. Charles City-County Library District: Business Plan for Small Service Firms

- Deloitte & Touche: Growth Company Services Writing an Effective Business Plan
Guest Speaker
The following class period, host a guest speaker who will focus on business plans and how they help to minimize the risk for entrepreneurs. Have the learners listen for the parts of the business plan that they have talked about. If these parts are not mentioned during the speech, ask about them yourself during the question and answer section at the end, or else have learners poised to ask for this information.

Assessment
Learners should be able to recognize the steps in the copy of the actual business plan that they receive. Learners should also start to be familiar with what is contained in a business plan and recognize when the guest speaker mentions that content. Learner will be able to demonstrate their understanding of the concept of entrepreneurship in the question and answer session following the guest speaker.

Practitioner Reflection
I wanted learners in my class to consider having their own businesses. It is my hope that the learners will find their hidden talents, become independent, and realize they can earn money all at the same time. The project to write a business plan helps learners explore the option of being entrepreneurs.

The next time I implement this lesson, I would coach the guest speaker to be sure to include the parts of a business plan in her presentation. I would also allow more time for the activity. The learners seem now to be familiar with business plans in general and are starting to recognize the steps involved in creating a business plan, but they still have questions. The information helped learners to begin to think about whether they could start their own businesses.

Learner Level
- Basic skills, grade levels 5.0-8.9
- Credentialing, grade levels 9.0-12.9

Learner Grouping
Whole class

Time Needed
Several class sessions

Setting
This learning activity took place in a Families First classroom meeting five days a week for four hours per day. There were five learners in the class.
Statistical Sampling

Learners collect data in the field and analyze it in class using tables and graphs to determine how many observations of a phenomenon are necessary in order to draw reasonably valid conclusions about it. This project is to teach learners the power of statistical sampling in searching for information.

**Learning Objective**
- Learners will analyze a problem situation to determine the need for data.
- Learners will plan how to obtain and organize data needed.
- Learners will analyze data and draw conclusions.
- Learners will write a report on their project.

**Work-Based Skills**

**EFF Skills:** Lifelong Learning Skills: learn through research; Communication Skills: observe critically, convey ideas in writing; Decision Making Skills: use math to solve problems and communicate.

**Learner Grouping**
Small group, Whole class

**Materials and Resources**
Clipboards, pencils, data sheets, watches, graph paper, calculators (optional).

**Subjects**
- Adult basic education
- Critical thinking
- Problem solving
- Job skills
- Life skills
- Mathematics

**Activity Description**
In talking with the class about loss of business in a restaurant (as an example), I found that learners have never faced the problem of making a consumer survey: what must be considered in getting unbiased data, how much data to get, etc. I decided to have the adult learners perform this vehicle experiment in order to give them some understanding about the single issue of how much data to collect. Along the way I did discuss considerations in ensuring that the sample data are unbiased in ways which would invalidate conclusions that might be drawn from the experiment. From this project, learners gained an elementary understanding of the use of statistical sampling to minimize data taking and the use of math and graphing to analyze data.

For this project, I decided to ask the class to determine the ratio of each of the following types of vehicles traveling along a busy interstate near our classroom: cars, mini-vans, SUVs, and pickup trucks. (If there are enough learners to do the activity, it could be expanded to find the ratio of vehicles of a certain color, etc. Actual data taking would be done at a safe location along the highway but at a position close enough to permit learners to recognize the selected vehicles.) I chose a location on

**Project**
This is a stand-alone project.

**Materials and Resources**
Clipboards, pencils, data sheets, watches, graph paper, calculators (optional).

**Learner Level**
All levels.

**Time Needed**
All work can be completed in two 4-hour class sessions.

**Setting**
This class is attended by 4-5 learners and meets four hours a day for five mornings a week. Learners are a combination of those who attend through Fresh Start and those required to attend the class in order to keep their welfare benefits, but attendance is still sporadic. The regular classroom equipped with tables rather than desks is used for most sessions.

For this learning activity,
planning and data analysis were done in the classroom. The data gathering was done in the field.

a dead-end access road that has a good view of the highway. I avoided a location within the city limits since that location might have involved double counting as vehicles return in the other direction after a short shopping trip.

This learning activity has four parts: preliminary discussion of the activity, data collection, analysis and plotting of data, and writing a report describing the activity.

Preliminary discussion of the activity

1. Lead a class discussion on the loss of business at a restaurant and what can be done about it. Have the learners think of all kinds of reasons for the loss and make a list of them without being critical of any.

2. Take the items on the list one-by-one and talk about the possible relevance and importance of each. Every time I have tried this, the class has agreed that a consumer survey should be done.

3. Discuss how to do a consumer survey so that the data obtained will be relevant and unbiased.

4. Talk about how many consumers have to be surveyed, and this leads directly to the issue of sample size.

<table>
<thead>
<tr>
<th>Time Period</th>
<th>a. cars</th>
<th>b. minivans</th>
<th>c. SUVs</th>
<th>d. pickups</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5. Since a consumer survey will be difficult to conduct, I shift to a different type of survey which is possible for the class, and discuss the vehicle count and how to determine what sample size would be appropriate.

6. I tell the class that we will do sampling to learn the ratio of four types of vehicles traveling on I-40: cars, minivans, SUVs, and pickup trucks. I explain that we will take counts of each type of vehicle in 5-minute intervals and that data sheets will be required.

Data collection
1. I ask the class to construct the Data Gathering sheet and describe how the data will be taken (who will do what, etc.). For clarity, call this Sheet 1. Sheet 1 will have five columns. On the left is the column for listing the number of the 5-minute interval. (Numbered in advance from 1 to 24, the column holds two hours worth of data.) In the next four columns, a, b, c, and d, tally each of the vehicle types for each 5-minute interval. Column “a” is for cars, column “b” for minivans, and column “c” for SUVs, and column “d” for pickups. When Sheet 1 has been completed, cell 1a contains the number of cars that passed the checkpoint during the first 5-minute time period. In like fashion, cell 24d is the tally of the number of pickups that passed the checkpoint during the last 5-minute time period.

2. An example of how Sheet 1, the Data Gathering Sheet, might look before being used is shown on the previous page (L-22).

3. Having explained all the above, and having prepared the data-gathering sheet, it is now time to take the class to the “field” to collect data. Divide the learners into groups of three. Each group needs the data-gathering sheet, a clipboard, a watch, and a couple of pencils. Duplication of data taking is OK and can lead to a bit of rivalry in analysis and results. One learner in each group should be the data taker tallying the number of vehicles of each description in the correct cell as they are called out. The second learner is the time-keeper, calling out the five-minute intervals. The third person is the vehicle observer calling out the identity of vehicles as they pass. The observer must be one who knows how to identify the different types of vehicles correctly.

4. Shown below is a sample of how the data sheet might look if the tallies were then transcribed as numbers.

<table>
<thead>
<tr>
<th>Time Period</th>
<th>a. cars</th>
<th>b. minivans</th>
<th>c. SUVs</th>
<th>d. pickups</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>7</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>7</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>4</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>24</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>
5. Taking data is tedious work, and gets somewhat boring. A nice reward is a stop at Burger King or McDonald’s on the way back to the classroom.

Analysis and Presentation of Data
Now it is necessary to talk about how the data will be analyzed and how to decide when a sample is large enough. The analysis and the decision about sample size could have been done while taking data at the highway, but to keep things simple, we do the analysis and decision making back in class. That means we undoubtedly collect more data than is actually required.

Analysis of the data will require one sheet of graph paper and the preparation of two additional data sheets. Data Sheet 2 will show the cumulative totals by time period of each type of vehicle as well as the cumulative total of all vehicles by time period. Data sheet 3 will show the ratio of the cumulative counts on Sheet 2 to the row total count in column e. of Sheet 2.

1. Have learners prepare Sheet 2 to be similar to the empty Sheet 1 except that it must have one additional column on the right, Column e., for the cumulative total of all vehicles counted. The number of the 5-minute intervals in the far left column will be the same as on Sheet 1. The row of data for time period 1 will be the same as on Sheet 1 with the numbers in columns a., b., c., and d. summed for column e. For time period 2, the cumulative number of cars for time periods 1 and 2 will be placed in column a., the cumulative number of minivans for time periods 1 and 2 will be placed in column b., etc. Then all the numbers in row 2 are added for column e to equal the combined number of vehicles that passed the checkpoint in the first two time periods. Likewise, the number in row 3, column a. will indicate the total number of cars counted in the first 3 time periods, etc. Following this pattern, the number in row 3, column e. should be the total number of cars, minivans, SUVs, and pickups that have passed the checkpoint in the first 15 minutes of data gathering. Using the sample data from Sheet 1 above, the completed Sheet 2 would be as follows: (see page L-26.)

2. Sheet 3 will be similar to sheets 1 and 2. The 5-minute intervals will be the same as before. The entry in each of the next four columns will be the ratio of cumulative counts to the row total count in column e. (all numbers taken from Sheet 2). Then for comparative purposes, the ratio will be changed to decimal fraction. A calculator may be used. Again using the above sample data, Sheet 3 when completed looks like this: (see page L-27.)

Thus, after 30 minutes (time period 6), the total number of pickups that have passed the checkpoint (using this sample data) is 15 and the ratio of pickups to total vehicles after 30 minutes is 15 out of 103 or .15 (15%).

3. The ratios computed on sheet 3 should be plotted on the graph paper with 5-minute interval on the abscissa, and ratio on the ordinate. A unique symbol should be used for the ratios of each vehicle type. The ratios for each vehicle type will likely jump around a bit for the first few 5-minute intervals, but should then begin to settle down to a fairly straight horizontal line for the later 5-minute intervals. The 5-minute interval at which the ratio settles
down to (or near) the straight line is the approximate desired time required for taking data.

4. Data analysis follows the “field” trip. After the graphs are finished, ask each group to tell how many 5-minute intervals would have been sufficient to get reasonably accurate estimates of the true ratios. Discuss what is meant by “reasonably accurate.” Would, for example, “reasonably accurate” be the same in quality control of medicinal drugs or of dimensions of ball bearings as it would be for a vehicle count? What is “reasonably accurate” will be different in different fields, or even in the same field depending on the purpose for which the results are to be used.

Writing the Report
Following the data analysis, each learner is asked to write a report detailing the problem researched, the methods used to gather data, and the results of the study.

Assessment
The writing assignment, the report of how this problem was researched, will show whether or not the learners understand statistical sampling. Learners should be able to explain how to run an experiment to determine what fraction of cars on the highway are driven by, for example, men who wear hats. They should be able to tell (after the fact) how many 5-minute intervals of observations are required to make a reasonably accurate estimate of this fraction. To determine if the learners can generalize to other problems, a different sort of problem could be presented for class discussion to see how learners would go about solving it and delimiting the amount of data needed.

Practitioner Reflection
I have no reflections since I have not done this one yet. It is a warm weather activity and I expect to do it soon.
### Vehicle Observation

**Sheet 2—Cumulative Totals by Time Period**

<table>
<thead>
<tr>
<th>Time Period</th>
<th>a. cars</th>
<th>b. minivans</th>
<th>c. SUVs</th>
<th>d. pickups</th>
<th>e. cumulative total of counted vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>7</td>
<td>6</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
<td>11</td>
<td>10</td>
<td>7</td>
<td>42</td>
</tr>
<tr>
<td>3</td>
<td>22</td>
<td>18</td>
<td>13</td>
<td>9</td>
<td>61</td>
</tr>
<tr>
<td>4</td>
<td>29</td>
<td>22</td>
<td>15</td>
<td>12</td>
<td>78</td>
</tr>
<tr>
<td>5</td>
<td>32</td>
<td>26</td>
<td>19</td>
<td>14</td>
<td>91</td>
</tr>
<tr>
<td>6</td>
<td>35</td>
<td>30</td>
<td>23</td>
<td>15</td>
<td>103</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>347</td>
<td>262</td>
<td>216</td>
<td>147</td>
<td>972</td>
</tr>
<tr>
<td>24</td>
<td>354</td>
<td>267</td>
<td>221</td>
<td>150</td>
<td>992</td>
</tr>
</tbody>
</table>
### Vehicle Observation

**Sheet 3—Cumulative Ratios by Time Period**

<table>
<thead>
<tr>
<th>Time Period</th>
<th>a. cars</th>
<th>b. minivans</th>
<th>c. SUVs</th>
<th>d. pickups</th>
<th>e. cumulative total of counted vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10/25 = .40</td>
<td>7/25 = .28</td>
<td>6/25 = .24</td>
<td>2/25 = .08</td>
<td>25</td>
</tr>
<tr>
<td>2</td>
<td>14/42 = .33</td>
<td>11/42 = .26</td>
<td>10/42 = .24</td>
<td>7/42 = .17</td>
<td>42</td>
</tr>
<tr>
<td>3</td>
<td>22/61 = .36</td>
<td>18/61 = .30</td>
<td>13/61 = .21</td>
<td>9/61 = .15</td>
<td>61</td>
</tr>
<tr>
<td>4</td>
<td>29/78 = .37</td>
<td>22/78 = .28</td>
<td>15/78 = .19</td>
<td>12/78 = .15</td>
<td>78</td>
</tr>
<tr>
<td>5</td>
<td>32/91 = .35</td>
<td>26/91 = .29</td>
<td>19/91 = .21</td>
<td>14/91 = .15</td>
<td>91</td>
</tr>
<tr>
<td>6</td>
<td>35/103 = .34</td>
<td>30/103 = .29</td>
<td>23/103 = .22</td>
<td>15/103 = .15</td>
<td>103</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>347/972 = .36</td>
<td>262/972 = .27</td>
<td>216/972 = .22</td>
<td>147/972 = .15</td>
<td>972</td>
</tr>
<tr>
<td>24</td>
<td>354/992 = .36</td>
<td>267/992 = .27</td>
<td>221/992 = .22</td>
<td>150/992 = .15</td>
<td>992</td>
</tr>
</tbody>
</table>
Researching a Business

Learners research a local business that is in the same professional field as the business we will be setting up. We visit the business, interview the manager, and observe the various professional duties of the employees. We later write thank-you letters and begin to analyze our observations.

Learning Objective
• Learners will gather and analyze business information gleaned from a similar local business.
• Learners will work together cooperatively to gather and analyze this information.
• Learners will write a thank-you letter.

Activity Description
1. Explain to the learners that they have the opportunity to develop and operate a new class business. (For the action research grant, our class develops a research publication company that researches the businesses in our city and publishes a resource book with the information.)

2. Learners identify the business in the surrounding area most similar to the one they wish to create.

3. Set up a field trip to the business identified by the learners in order to research that business’s organization and professional functions. (Our class took a field trip to the local newspaper, interviewed the managing editor, and toured the plant operation.)

4. Preview the field trip by discussing the information that the learners need to obtain that will better enable them to formulate their own business. (I asked many open ended questions regarding what information would be helpful for us to obtain regarding the nature of their business. Example: From our current knowledge of a newspaper, what professional functions do we believe would be similar?

Project
We received an action research grant to create a work-focused Families First classroom. We created and managed a small business for our project. This is the first of five lessons in this series on setting up the class business:
1. Researching a business
2. See How We Run (Our Business)
3. “And By What Name Shall This Business Be Known?”
4. Announcing Who We Are
5. Setting Up For Business

Materials and Resources
• Field trip to a local business that is similar to the new class business.
• Camera with film

Learner Level
• Basic skills, grade levels 5.0-8.9
• Credentialing, grade levels 9.0-12.9

Learner Grouping
Whole class

Families First is the Tennessee program to provide training for those welfare recipients who lack basic education skills. While learners do work toward a GED, emphasis in these classes is shifting toward the knowledge, skills, and attitudes learners need to acquire and keep a good job.
to our new publishing company? What specific questions do we need to ask in order to understand their company organization, the production of their product, and the specific duties each employee performs? What other information would be helpful for us to obtain?)

5. Make decisions regarding the specific function of each class member on the field trip. (Example: Who will lead the interview? Who will be responsible for taking photographs? Who will be responsible for documenting the information? Does the class wish to appoint individual assignments such as photographer, recorder, and interviewer, or will each class member function in every role?)

6. Go on the field trip to the local business and allow learners to perform functions they have decided upon earlier. The practitioner should only operate as a guide, not the leader, in order to allow learners to take responsibility for their learning.

7. Have the learners write a professional thank you letter to the business thanking them for allowing the class to visit and interview them.

8. Guide the class to summarize the information they learned on the field trip noting the similarities and differences between the business visited and the class business.

9. Demonstrate how to take information learned from the field trip and apply it to making organizational decisions for the class business.

Assessment
• To assess their cooperation, the practitioner must closely observe each learner’s behaviors to see that no learner is allowed to dominate decisions. Encourage participation from all participants.
• The practitioner can direct learners to document the specific ways in which they participated and the experience they gained through this activity in their personal work-force journal. The work-force journal should include the learner’s personal reflections after each work-force activity.
• Assess whether or not learners have gathered the information they need during the discussion of similarities and differences between the business visited and the class business.
• The class should complete a professional-looking thank you letter.

Practitioner Reflection
I have found it to be far more challenging and time consuming to guide the learners into making their own business decisions, rather than directing the new class business myself. I believe, however, that this direction is vitally important in enabling the learners to obtain critical decision-making skills, gain insight into the operation of a business, and develop a professional work ethic.

Because this activity took place at the beginning of the action research project, learners who entered the class in the following months did not have the opportunity to obtain the same knowledge and experience that the original class members did. The original class members handled this situation by personally recounting the activities and business decisions that had been made. If the class were to do a similar project again, I would strongly encourage the use of one business notebook containing all of the pertinent information, decisions, activities, and instructions. This notebook could be used to initiate the new class members into the class business project.

Time Needed
Approximately two to four hours

Setting
This learning activity was used in a Families First Class that met five days a week for four hours per day. We used a regular classroom setting as well as the field trip for this activity.
Business and Industry Resource Book

Through visits to various places of business in the community and interviews with company officials, learners compile business information including company goals, job types, benefit packages, salaries (if available), and positions open at that time. Learners then create the Business and Industry Research Book to be utilized for career planning and/or job search. The project is carried out periodically to keep the resource book up to date.

Learning Objective
Learners plan, research, and design a directory of local business and industry information that is tailored to their questions.

Work-Based Skills
EFF Skills: Lifelong Learning Skills: learn through research; Decision Making Skills: plan; Communication Skills: convey ideas in writing; Interpersonal Skills: cooperates with others.

KSAs: Accurately performs work; Follows instructions; Knows standard procedures; Quality in the workplace; Cooperates with others; Works on a team effectively; Listens for understanding.

SCANS: Basic Skills: writing; Information Skills: acquires and evaluates information, organizes and maintains information, interprets and communicates information; Thinking Skills: seeing things in the mind’s eye; Interpersonal Skills: participates as a member of a team; Resources: human.

Activity Description
Through class discussion, it was observed that many learners were not familiar with all the businesses and industries located within the county. Many learners did not know what some of the companies did, what types of jobs were available, salaries or starting hourly rates, and other information that would be valuable to a present or future job seeker.

The overall design of this learning activity is for learners to gather information about local businesses by visiting the business and interviewing company representatives and taking pictures. The information is then compiled business by business in a scrapbook format which learners can use for career planning and/or job search. The project is carried out periodically to keep the resource book up to date.

1. To begin, the practitioner must decide how assignments will be divided among groups. Some

Materials and Resources
1. Master questionnaire for business and industry
2. Scrapbook, photo album, or loose leave binder.
3. Camera (disposable cameras are inexpensive and work well)

Learner Level
• Basic skills, grade levels 5.0-8.9
• Credentialing, grade levels 9.0-12.9

Learner Grouping
Small group, whole class

Time Needed
Several class sessions

Setting
These activities were conducted in Adult Education and Families First classes in a classroom setting. Classes were held Monday through Friday 8:00 AM to 12:00 NOON. Out of classroom activities took place to visit local businesses and industries. There were 10 learners in class.

Families First is the Tennessee program to provide training for those welfare recipients who lack basic education skills. While learners do work toward a GED, emphasis in these classes is shifting toward the knowledge, skills, and attitudes learners need to acquire and keep a good job.
suggestions are: (1) the practitioner can assign groups to interview specific companies; or (2) assign groups to interview companies in specific community locations.

2. A list of questions to ask each company will be created as a group activity. A questionnaire should be created for groups to record information of each visit. Some items to be included are company name, physical address, phone number, number of individuals employed, different job positions, type of benefit packages, current hiring situation, use of temporary services, etc.

3. The practitioner will divide the class into groups of two to four individuals.

4. Ground rules for assignment are to be discussed. One ground rule to be included is to make sure the roles of interviewer and photographer are rotated.

5. Groups are given their company assignments, interview sheets, and cameras. Time should be allowed for groups to make appointments, if necessary, and find the location of companies. (Some companies will be receptive to on-the-spot interviews, whereas some will not be).

6. Groups will then gather the information. This should take place in several sessions.

7. As visits are completed, the groups can begin planning the format, then organize and catalog the information in a scrapbook, photo album, or loose leaf binder. A special prominent place should be reserved for indicating when companies are hiring, the position, etc. This information will be updated regularly and so should be in a format that can be easily changed.

8. Finally, arrangements should be made to periodically schedule the updating of the resource book with job opportunities, added benefits, new companies, etc. Practitioners can employ various techniques for this activity (contact company directly, scan want-ads, contact local Labor and Workforce Development office, Chamber of Commerce, etc).

**Assessment**
Completion of the Business and Industry Research Book meets the objective set for this learning activity.

**Practitioner Reflection**
This activity was valuable because the learners utilized a variety of skills to become more familiar with the workplace. As this activity continues, we would like to use a digital camera and computer to make a more professional looking resource book. Also, we plan to use a wall calendar to schedule the days that the resource book will be updated.
Building Memories…

To understand the value a photograph holds for a potential customer and his or her family, the learners observe the impact of photographs on their own family by creating and laying out the design of a family photo album.

Learning Objective

• Learners will demonstrate organizational, communication, and observational skills by creating and laying out the design of a family photo album complete with written reflections.
• Learners will analyze the impact of photographs on consumers by observing and recording the reactions of various family members to their family album over a period of one week.
• Learners will gain an understanding of select photography terminology by defining 90% of the terms correctly on a vocabulary quiz.
• Learners will examine and identify their feelings regarding their family by writing a response in essay format to be included in the album.

Work-Based Skills

EFF Skills: Lifelong Learning Skills: learn through research, reflect and evaluate; Decision Making Skills: plan; Communication Skills: convey ideas in writing; Interpersonal Skills: cooperates with others.

KSAs: Accurately performs work; Follows instructions; Knows standard procedures; Quality in the workplace; Cooperates with others; Works on a team effectively; Listens for understanding.

SCANS: Basic Skills: writing; Information Skills: acquires and evaluates information, organizes and maintains information, interprets and communicates information; Thinking Skills: seeing things in the mind’s eye; Personal Qualities: self-esteem, self-management; Interpersonal Skills: participates as a member of a team; Resources: human.

Subjects

• Family literacy
• General education development
• Consumer education
• Sciences
• Writing skills

Activity Description

Background: Learners had a variety of past experiences with portraits and portrait making: some said it had been years since their last family portrait, others stated they never had family pictures made, and some expressed they did not see the value in paying studio prices to get portraits made. Yet, since learners chose to enter the photography industry, they needed hands-on experience taking family portraits. To provide the learners practical experience taking pictures and to generate a understanding of the value a photograph holds for a potential customer, this learning activity was developed.

Materials and Resources

• film (slower film provides better color quality)
• access to a quality developing lab
• index cards, markers, colored pencils, clip art, and/or caption stickers
• photo albums (pages are pockets that hold the photo)
• Handout 1: A vocabulary list of terms relating to photography
• Handout 2: Sentence starters
• Pictures gathered from magazines, newspapers,

Families First is the Tennessee program to provide training for those welfare recipients who lack basic education skills. While learners do work toward a GED, emphasis in these classes is shifting toward the knowledge, skills, and attitudes learners need to acquire and keep a good job.
or from their own collection to use as examples of good vs. bad photography.

Arrange for a photographer to spend a day with your class teaching them about technique and what to look for in judging the quality of different shots. Alternatively, make arrangements for a field trip to a developing lab, museum, or to a university photography department to expose your learners to professionals in the photo industry.

Learner Level
Basic skills, grade level 5.0-8.9

Learner Grouping
Individual, small group, whole class

Time Needed
Several class sessions

Setting
This activity was presented to a Families First class that met five days a week for four hours a day. There were four learners in the class.

This activity was one in an entire unit of activities on opening a small business. The focus of this activity was to determine consumer wants and needs by discerning the value of the product to the consumer by observation.

ness is the ability to communicate your goals to potential financiers, to business associates, and to customers. When entering the photography industry in particular, you must organize, handle, and store photos in a manner that protects the quality and appeal of the photograph. Finally, it is important for the entrepreneur to understand the customer’s wants and needs by discerning how important the product is to the customer.

1. Ask the learners to think about some of the fondest memories they have as children. Ask how many of them have pictures or once had pictures that captured that moment for them. If some learners have photos of those precious moments, then ask them if those photos mean anything to them now. Do photos hold sentimental value for them? Discuss the meaning of the term “sentiments.” Would they be able to throw these photos away today? Ask those who do not have pictures of those special memories how much it would be worth to them today if they could buy pictures of those long ago memories. Discuss their answers. Point out to them the unique opportunity they have to save memories for their children. How do they want their children to remember them when they are gone? Through time faded memories, or actual pictures they can pick up at any time and remember with clarity?

2. Discuss the magazine clippings or actual photos you have gathered as examples of good vs. poor photography. Option: have the learners bring in their “best” photos to share with the group.

3. Give each learner a roll of film, or a disposable camera if they do not own a camera at home. Have them shoot the roll of film of their immediate family only.

4. Take the film to a quality developing lab. If you ask, the manager may be willing to grant you a school discount on developing.

5. Spend a day with a photographer or other photo industry professional to provide your learners insight into photography careers and techniques used to take good photos.

6. After the field trip or guest speaker, have the learners shoot a second roll of film of their family, using new techniques, perspectives, or ideas they gained from professional exposure.

7. Have the learners organize their photos in an album, using index cards to write captions for each photo. Hand out sheet of sentence starters for them to get ideas of what to write. Make certain the album is NOT the kind with the cellophane overlaying a sticky background. These albums do not preserve the quality of the photograph. Use albums with pocket inserts instead.

8. Using markers, colored pencils, and/or clip art, have the learners design a cover page for their album, encouraging them to be as creative as possible. Make examples of cover sheets and index cards with captions to give them ideas of and help stimulate their creative abilities.

9. Have the learners write an essay, responding to the statement: Twenty years from now, if you could look back to today and tell your children about how your love endured for them despite struggles at the time.
what would you say? What little things did they do that made you happy? What put a smile on your face? What made you proud? How were they important in your life? How much do you love them still?

10. Upon completion of the albums, give the learners an observation sheet to take home with them. Explain to them that they are going to conduct scientific research. Have them hypothesize what they think their family’s reactions to the album will be. Have them record the frequency in which the album is accessed, and by which family members. Have them record comments concerning the actual reactions from various family members. The data will be collected for a week, after which the learners will create a graph of their data. Did the results support their hypothesis? Why or why not? Did the results change their opinion of the overall importance of family albums? Why or why not?

**Assessment**

Objectives 1-4 would be met by the learners upon completion of a family photo album, an observation record sheet, a score of 90% or better on a vocabulary quiz, and the completion of a written essay that will be included in the album.

**Practitioner Reflection**

I discovered that some learners did not value the idea of taking photographs in order to preserve memories for their children. If they even took photos on special occasions, the pictures inevitably ended up being tossed around in some obscure drawer or box; the negatives, if not lost completely, were stored improperly. I also discovered the learners had few or no photographs of themselves from when they were children. I wondered how, if the learners did not find value in the product they are selling in their small business, they could possibly understand the wants and needs of their customers.

If I had it to do over again, I would spend the extra dollar to buy learners a well laid out photo album. Although I did purchase a pocket photo album, there was no place in the album to store the negatives. Also, the pages were bound into the album, instead of being locked in place by a ring binder. This format does not allow one to insert extra pages or an envelope to hold negatives.
Vocabulary Terms

**Composition**—The way in which objects in a picture are arranged.

**Shutter**—The part of the camera that opens and closes.

**Shutter speed**—How fast the shutter opens and closes. Example: 1/60 of a second is the most commonly used shutter speed by photographers.

**Aperture**—The size of the shutter opening.

**F-Stop**—The actual measure of the aperture of your lens. Example: 2.8, 4, 5.6, 8, 11, 16, 22.

**Focus**—The crispness of an image in your photo.

**Depth of field**—The range, or depth, of the place in your photo that is in focus. Never is EVERYTHING in focus in one picture. Always focus on the subject’s eyes, and their face will be in focus because it will fall within your depth of field.

**Diffused light**—Light that is shining through fabric, sheers, clouds, or an umbrella, causing the light to land softly on the subject. This creates a warm “glow” around them.

**Intensity**—A measure of the brightness of the flash or surrounding light. A flash that is too bright causes over-exposure. Everyone in the photo is washed out.

**Light meter**—A piece of camera equipment that measures the intensity of the light around your subject.

**Tone**—The interplay of light and shade. The more shadows and bright places in one photo, the more tone there is. The combination of shadows and light in a photo look good, because it emphasizes facial features of your subject.

**Exposure**—The total amount of light allowed to pass through a lens to the film. This is done by controlling the size of the lens opening (aperture) and how fast that lens opening opens and shuts (shutter speed).

**Overexposure**—When too much light is allowed to pass through a lens to the film. The picture appears to be “washed out,” lacking in color.

**Underexposure**—When not enough light is allowed to pass through a lens to the film. The picture is very dark and images are hard to see.
Sentence Starters

1. When I was your age . . .
2. You always loved to . . .
3. You are happiest when you . . .
4. I remember when I . . .
5. You make me proud when you . . .
6. My most embarrassing moment was when . . .
7. In many ways you are like your __________; you both love to ____________.
8. You were always good at . . .
9. Always remember . . .
10. About boys . . .
11. About girls . . .
12. About dating . . .
13. When I met your father . . .
14. When I fell in love . . .
15. I'll never forget when . . .
16. When I was on my own . . .
17. My friends were like yours because . . .
18. Like you, I was closest with my ________ because . . .
19. My happiest moments were with ________ when I was your age .
20. My first accident was when . . .
21. I used to believe . . . but now I feel . . .
22. I love you because . . .
23. You make me special because . . .
Where in the World Is . . . ?

This activity is part of a project to develop map-reading skills. The activity is repeated each time a world location comes up in the course of our class work. This activity will be followed by reading the county map, the city map, and a map of a corporation or building.

Learning Objective
When given the name of a city or country, ocean, river, desert, etc., the learner will know how to use resources to correctly locate the place on a world map.

Work-Based Skills
EFF Skills: Lifelong Learning Skills: learn through research; Communication Skills: read with understanding.

KSAs: Accurately performs work; Follows instructions; Knows standard procedures; Reads work related text.

SCANS: Basic Skills: reading; Information Skills: acquires and evaluates information, organizes and maintains information, interprets and communicates information.

Subjects
• Social sciences
• General education development (GED)
• Life skills

Activity Description
Many jobs require the kinds of skills that it takes to read a map, where the visual is a representation of some larger reality. Reading diagrams is one example. Some jobs specifically require map-reading skills. Repair persons and delivery persons, for example, need to know how to read a map to find the place to which they are to go.

This lesson should take place any time a location comes up in class discussion such as during a discussion of world events found in the newspaper or following a news item of interest that has occurred on TV. When the practitioner is aware the learners are not familiar with the location, this is the time.

We have several kinds of maps in the classroom: world maps and globes with political boundaries, country maps, state, county, and city maps. Whenever a place comes up in a class discussion, I say, “Where in the world is that?” This signals a search!

We first use any context clues to help us. Do we know whether the place mentioned is a city or a country? Can we tell what part of the world it is in? Does anyone already know the location of this place? What other places that are near this place are mentioned in the story or newscast?

When we can’t locate the place on a map using context clues, we resort to research in encyclopedias and atlases.

Materials and Resources
Maps, atlases, globes, encyclopedias, computer encyclopedia programs

Learner Level
Beginning, intermediate, or advanced

Learner Grouping
• Individual
• Small group
• Whole class
• Self-directed student work

Time Needed
Less than 1 hour

Setting
This activity is conducted in a regular Families First Class of about 15 learners. The class meets five days per week and four hours per day in a regular classroom setting.

Families First is the Tennessee program to provide training for those welfare recipients who lack basic education skills. While learners do work toward a GED, emphasis in these classes is shifting toward the knowledge, skills, and attitudes learners need to acquire and keep a good job.
Sometimes we try to find out more about the place that would help us to better understand the news story. Sometimes we don’t have that much time, and we just locate the place and go back to our other work.

The lesson can also be planned with specific locations required. Ask the learners to locate a particular place on a world map, e.g., Cuba. Other places can be required. Places that are currently in the news are always good to choose.

**Assessment**
Because this activity happens frequently in our class, the learners are getting more proficient in locating places on the map. They are also developing an interest in knowing the locations of places mentioned.

**Practitioner Reflection**
My students have started asking the “Where in the world is that?” question themselves when a location comes up that they are unfamiliar with. We are going to expand this lesson in reading maps from places like countries and cities to locating streets and intersections on a city map. It would follow to generalize to other similar skills such as reading building plans and diagrams.
Comparative Evaluation of Different Makes of Flashlight Batteries

Learners help to plan and implement an experiment to compare and evaluate flashlight batteries of different makes. In the process they learn those elements of electricity required for the experiment, procure and assemble the equipment required, record, and then plot the voltage output of batteries under load as a function of time, and determine which make of battery appears superior. They then write a report describing the experiment.

Learning Objective
• Learners will help to plan a scientific experiment to compare the durability of different brands of batteries.
• Learners will set up and become familiar with equipment.
• Learners will collect, analyze, and graph data.
• Learners will draw conclusions and write a report.

Work-Based Skills
EFF Skills: Lifelong Learning Skills: learn through research; Decision Making Skills: plan, use math to solve problems and communicate; Communication Skills: convey ideas in writing

KSAs: Accurately performs work; Follows instructions; Knows standard procedures; Quality in the workplace.

SCANS: Basic Skills: writing, arithmetic/mathematics; Information Skills: acquires and evaluates information, organizes and maintains information, interprets and communicates information; Thinking Skills: seeing things in the mind’s eye.

Subjects
• Critical thinking
• Consumer education
• Problem solving
• Sciences
• Technology
• Writing skills

Activity Description
The idea for this experiment came from my 8th grade granddaughter who did it as a science project in her school. In talking with my own class about the experiment, I discovered the learners had a strong bias in favor of the ENERGIZER battery because of the clever advertisements on TV. They “knew” what the outcome would be, and eagerly set out to prove it. They were a bit shocked at the results. The learners in my class had very limited experience in the industrial world, and this experiment was an effort to expand this experience.

This activity demonstrates a somewhat typical laboratory experiment requiring (1) planning, (2) set-up of and familiarization with equipment, (3) data taking, (4) analyzing/graphing data, (5) drawing conclusions, and (6) report writing. Data must be recorded accurately and neatly. The work is

Materials and Resources
1. 3 different makes of AA or AAA flashlight batteries of the same date
2. One 3-ohm resistor (Radio Shack did not have a 3-ohm resistor so we made one by connecting two 10-ohm and two 15 ohm resistors in parallel.) Tolerance should be 5%.
3. One battery holder from Radio Shack to fit the size battery selected
4. Four hookup wires with alligator clips on both ends from Radio Shack
5. One volt-Ohm meter which shows voltage to 3 decimal places (Actual readings will be between 0 and 1.5 volts.)
6. One tablet for recording data
7. One watch for reading minutes
8. One sheet of graph paper
9. One fine point automatic pencil for plotting data

Families First is the Tennessee program to provide training for those welfare recipients who lack basic education skills. While learners do work toward a GED, emphasis in these classes is shifting toward the knowledge, skills, and attitudes learners need to acquire and keep a good job.
somewhat tedious and very repetitive. It gives experience in plotting data and interpreting results. Some physics background information is necessary in order to understand the experiment.

**Background:** I started the experience by talking about the pieces of equipment to be used and of electrical terms. Physics book definitions of electrical terms are somewhat difficult to grasp without getting into a lot of additional definitions which I did not want to go into, so I explained electrical concepts in terms of an analogy with city water systems:

**Planning:** The first step here is to talk about what characteristics of batteries we could consider in a comparative test. Possibilities include initial voltage and how the voltage declines under load (“load” being something such as a light bulb which uses current from the battery) as a function of time, price, and leakage of fluid from the battery as it ages.

The characteristic we chose to measure was voltage since it would tell us how the light in a flashlight would grow dimmer as a function of time.

So how do we measure voltage? Voltage is measured by an instrument called a voltmeter (or volt-Ohm meter), and I exhibited one and told how it is used. The volt-ohm meter has a digital display, so the data taker only need read the numbers on it and write them on the data sheet. Since we wanted to measure voltage as a function of time while the battery is under load, I explained that a resistance could be used as the load, and that resistors can be purchased at Radio Shack. Resistors are small cylinders with wires running out of each end. The wires are about two inches long at each end. The resistors have colored bands painted around one end indicating the tolerance and the Ohms rating. They come in a package which also gives the code on how to read the tolerance and the Ohms. They may come several to a pack, or just one, depending on the wattage rating. Half-watt resistors are good enough for this battery experiment, although a larger wattage rating will do just fine also. I showed some to the class and explained how to read both the resistance and the “tolerance” of the resistance (i.e. how close to the identified resistance its actual resistance had to be). For example a 10-Ohm resistor (as read from the colored bands on it) with a tolerance of 5% must have an

<table>
<thead>
<tr>
<th><strong>Electrical System Components</strong></th>
<th><strong>City Water System Components</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Current (amperage) or the rate of flow of electrons in an electrical circuit</td>
<td>is analogous to the rate of flow of water in water pipes.</td>
</tr>
<tr>
<td>Voltage, the force which controls the rate of flow of electrons (i.e. current) in the wire</td>
<td>is analogous to the pressure of water in water pipes. (This pressure is determined by the height of the water tank and the depth of water in the tank.)</td>
</tr>
<tr>
<td>Resistance (measured in Ohms) in an electrical circuit also controls the rate of flow of electrons and</td>
<td>is analogous to a water faucet which controls the rate of flow of water.</td>
</tr>
<tr>
<td>A capacitor (measured in Farads) in an electrical circuit temporarily stores electrons causing a large surge in electron flow (i.e. current)</td>
<td>is analogous to the water tank attached to a toilet in that it fills slowly but can dump its entire contents in a very short time causing a large surge.</td>
</tr>
<tr>
<td>A wire in an electrical circuit</td>
<td>is analogous to a water pipe. <em>(The bigger the pipe or wire, the more water or current it can handle.)</em></td>
</tr>
</tbody>
</table>
actual resistance between 9.5 and 10.5 Ohms. For our experiment I wanted a resistor of no more than 5% tolerance. I had done some experiments at home before starting the one in class and I determined that a 3-OHM resistor would be about the right size (size in the sense of resistance, not physical size). Radio Shack did not have 3 Ohm resistors so I showed the class how we could make a 3 Ohm resistance by connecting two 10 Ohm and two 15 Ohm resistors in parallel. I had to show what is meant by parallel. To wire them in parallel, twist the wires at each end together and solder them together. The orientation of each resistor in the pack does not matter. The result is 4 wires twisted and soldered at each end. The two ends are not connected together; they form part of the circuit as the diagram shows (see Handout 1), so that current flows through the pack. And I showed how one computes the effective resistance, \( R \), of resistors in parallel. (The way to do this may, in fact, be a question on the GED test):

\[
\frac{1}{R} = \frac{1}{10} + \frac{1}{10} + \frac{1}{15} + \frac{1}{15} = \frac{1}{3}, \text{ so } R = 3.
\]

I then showed how to verify this calculation by actually measuring the effective resistance with the volt-Ohm meter.

The choice of battery size is important. Again I did some experiments at home and found that size “C” or “D” batteries would drag out the data taking time forever, but that use of an “AA” size would take about two hours. So I got an “AA” size battery holder from Radio Shack, and 4 hookup wires with “alligator” clips on both ends.

**Setting up of and familiarization with the equipment:** The next step was to wire up the circuit, but first a word of warning: Do not complete the circuit until the data takers and the meter readers are ready to start work because completing the circuit early will cause a drain on the battery and invalidate the results.

The battery holder has two wires attached to it. Place a piece of tape on the end of one of them to keep it from completing the circuit prematurely. Attach one end of one hookup wire to the bare end of the other wire from the battery holder, and the other end of the hookup wire to one end (either end) of the resistors soldered in parallel. Set the volt-Ohm meter to voltage, and its scale to 2 volts, and turn it on. Attach one end of a second hookup wire to either terminal on the voltmeter and the other end to the same end of the resistors as the battery wire. Attach one end of a third hookup wire to the other terminal on the voltmeter, and its other end to the other end of the resistors. Attach one end of the fourth hookup wire to the end of the resistors which now has only one hookup wire attached. Do not attach the other end of this fourth hookup wire to anything at the moment. The equipment now is ready to use for taking data. See the enclosed diagram (Handout 1).

**Data taking:** Have the class prepare a data sheet. The first column on the left will be for the minute number (actual time is not important). The second column is for the meter reading at the indicated minute number. Three or four sets of two columns can be put on the same data sheet. Minute numbers should go from 1 to 120 for two hours of recording. At the top of the data sheet, have the data taker record the names of the team of two, the date, the make of battery under test, and the start time (approximately). Repeat the
heading if the data runs onto a second or third sheet. Explain to the class the reason for recording this important information.

Seat the team of two at the equipment, one with a watch showing minutes clearly. Now unwrap the tape from the second battery holder wire and carefully hold it in one hand and the remaining free alligator clip in the other. Ask the data taker/timekeeper to call “mark” when the minute hand is on an even minute. When “mark” is heard, attach the alligator clip to the bare wire in your hand and tell the data taker to record the first reading from the meter. Lay the alligator clip on the table so that it does not touch another bare wire or clip. The team now is set up to take data for two hours. This team can be interchanged with another team from time-to-time in order to relieve fatigue and boredom (emphasize that some jobs in life are boring but that does not mean they are unimportant), but when an interchange is made, be sure that no data are lost.

Earlier, I indicated that the resistors serve as a load. Ask learners to touch a light bulb after it has been turned on, and to tell how it feels. It is hot, indicating that the electricity to run the light has been converted to heat, and that this is typical of a load converting one form of energy to another. During the experiment, ask them to carefully pick up the resistor assembly, so as not to disturb the connectivity of the wires, and squeeze it between their fingers. Ask them what they feel, and to explain this feeling.

Analyzing and graphing data: When the two hours are up, have the team plot the meter readings on graph paper. The minute number should be along the abscissa, and the voltage reading along the ordinate. Ask the class to determine how to choose the scale for the ordinate axis. This is a useful exercise. Tell them the maximum value will be 1.5 volts, and minimum possible will be 0 volts. Make sure that the person who plots the data uses a sharp pencil, writes lightly, and uses a unique symbol for data points for each make of battery.

Drawing conclusions: When the graph has been completed with data from all three batteries, show it to the class and ask what their conclusion is, and what they have learned about the value of an experiment.

Writing the report: Have each one write a report giving a complete description of the analogy between circuits and water systems, the objective of the experiment, the circuit used, how to calculate effective resistance of resistors wired in parallel, how to set scales on a graph, and what the results were. Ask them to tell in what way the results surprised them.

Assessment
Given dissimilar batteries to compare, for example an alkaline battery vs. a heavy-duty battery, the learner should be able to specify the equipment required, set up the circuit, take and plot the data, and interpret the results.

Practitioner Reflection
Two hours of data-taking time is rather boring for a class. Since we had only one volt-Ohm meter, only one group of two could work at a time. I would suggest a resistor of about 1½ ohms with AA batteries or 3 ohms with AAA batteries. Of course, while two people do the experiment, the remainder of the class can be studying for GED.
Volt-Ohm Meter

Effective resistance $R$ given by $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} = 3$ ohms
Increased Productivity

Learners work in small groups using several different methods to trim pencils. The methods used will show how production can be increased based on the methods used and the time consumed. Each group of learners writes a report detailing their findings.

Learning Objective
- Learners will contrast the productivity of different methods of accomplishing a task.
- Learners will draw conclusions about how productivity can be increased as well as what criteria and techniques are necessary for increased production.

Work-Based Skills
EFF Skills: Lifelong Learning Skills: learn through research, reflect and evaluate; Communication Skills: observe critically.

KSAs: Accurately performs work; Follows instructions; Knows standard procedures.

SCANS: Information Skills: acquires and evaluates information, organizes and maintains information, interprets and communicates information.

Activity Description
Determining the question to be answered—
1. Spend a few minutes in discussing productivity in general. What is productivity? Why is it important? What might affect productivity? How might productivity affect the “bottom line” for a business or industry? How can workers be more productive on the job?

2. Discuss with the help of learner involvement items they believe to be necessary in improving productivity in the workplace. Relate the discussion to specific workplaces where learners have work experience or to workplaces where they might be employed in the future.

Collecting Data
3. Have the learners divide into groups of two or three depending on the number in class.

4. Allow each group access to all of the materials and resources (see list). They can either have individual materials or share with the other groups.

5. Discuss which piece of equipment is likely to trim the pencils the fastest with the greatest quality of product being produced.

6. When divided into groups, have one learner trim pencils with each of the items provided. Allow 30 seconds for using each kind of pencil trimmer. A different learner times the person that is doing the trimming. For each device used to trim pencils, keep records of the number of pencils that are trimmed and the quality of production.

Materials and Resources
- A box of untrimmed pencils
- Table knife
- Paring knife or pocket knife
- Small hand-held “pocket” pencil sharpener
- Wall or desk mounted manual pencil sharpener
- Electric or battery operated pencil sharpener

Learner Level
Multilevel—can be adapted to any learning level

Learner Grouping
- Individual
- Small group
- Whole class

Time Needed
1 hr. session

Setting
This class was composed of 12 Families First learners who are attending class to achieve their GED and ultimately enter the workforce in the community. These learners are in class five days per week and four hours per day.

Families First is the Tennessee program to provide training for those welfare recipients who lack basic education skills. While learners do work toward a GED, emphasis in these classes is shifting toward the knowledge, skills, and attitudes learners need to acquire and keep a good job.
Drawing Conclusions
7. Each group of learners should collaborate to write a report of their findings. Learners should notice the increased productivity as they move from one method of trimming to the other.

8. Debrief the activity with a general discussion of productivity issues. Equipment is only one factor affecting production. An extension of this activity is to think of additional factors.

Assessment
The written reports and the concluding discussion are assessments of this activity. The written reports should clearly indicate that the learners understand what affects productivity in this particular task. The discussion will let the practitioner determine if learners can generalize about productivity to other situations.

The adult learners could easily see how the equipment used and the time it takes can determine the quality of the product produced. They could also see how production is speeded up depending on the machinery used. In our concluding discussion, we considered the cost of each “machine” used for pencil trimming. Sometimes it is worth more money for more quality and production.

Practitioner Reflection
I would not change the activity. It was a good activity in showing the learners how productivity is important in the workplace. It also showed the learners how the right machinery can increase productivity.
Improved Technology Improves Work Efforts

This learning activity involves using something as simple as light to show how improved technology can improve work efforts in the workplace. The use of different types of lighting throughout history has shown the advancement of technology and also how the work place has been improved for the workers thereby making it possible to produce more and better products.

Learning Objective
Learners will reflect on how improved technology can improve productivity.

Work-Based Skills
EFF Skills: Lifelong Learning Skills: learn through research.

KSAs: Accurately performs work; Follows instructions; Knows standard procedures.

SCANS: Information Skills: acquires and evaluates information, organizes and maintains information, interprets and communicates information.

Subjects
- Job skills
- Technology
- Work environment

Activity Description
1. Discuss changes in various work places over the past several years. Ask learners to think how these changes might have affected productivity or worker safety. Some changes affect how quickly a task can be accomplished. Others affect how well the task is completed. Some even affect how workers feel about their job by causing less stress to workers or making the job more enjoyable.

2. Explain to learners that they are going to try accomplishing some simple tasks using various sources (with differing qualities) of light. Talk about how the technology of lighting the workplace and the home has changed through the years.

3. Distribute one piece of lined notebook paper and a pencil to each learner.

4. Have learners fold their ruled paper in four quadrants making four rectangles per side of the paper. Using either side of the paper but with lines on the paper going horizontally across the paper, place a numeral 1 in the upper left-hand corner of any rectangle. Put a numeral 2 in the upper left-hand corner of any other rectangle. Continue until 5 rectangles are numbered.

5. Discuss the vocabulary words, “quadrant,” “intersect,” “rectangle,” “square,” “horizontal,” and “vertical.”

6. Turn the lights out in the room and pull the shades, making the room as dark as possible.

7. One by one, use the items listed above as “resources” as your only means of illumination.

Materials and Resources
- A candle
- A coal oil lamp
- An Aladdin lamp
- A 100 watt bulb on an electric cord
- A fluorescent lamp
- One sheet of ruled paper and a pencil for each learner

Learner Level
Multilevel—can be adapted to any learning level

Learner Grouping
- Individual
- Small group
- Whole class

Time Needed
1 hour
source of light in the room. For each source of light, a simple task is given for all to do. Be sure learners know that the task is not to test whether or not they can understand the directions, but rather how well they can see to accurately do the tasks. Give each of the directions as many times as necessary and review the vocabulary words as necessary so that learners understand what each task is.

8. Using the candle as the source of light, give these directions: “Use the quadrant you previously labeled #1. Draw a rectangle that sits on one of the lines of the paper and is five spaces high.”

9. Using the coal oil lamp as the source of light, give these directions: “Use the quadrant you previously labeled #2. Draw a vertical line that is six spaces high. Then across the top of the vertical line, draw a horizontal line to make a letter ‘T’.”

10. Using the Aladdin lamp as the source of light, give these directions: “Use the quadrant you previously labeled #3. Choose a horizontal line running across the middle of the quadrant. Trace this line across the entire quadrant.”

11. Using the 100-watt light bulb as the source of light, give these directions: “Use the quadrant you previously labeled #4. Find the second to the bottom line. Beginning approximately in the middle of that second to the bottom line, draw a vertical line to the top of the quadrant. Tracing the second to the top line, draw a horizontal line across the quadrant intersecting the vertical line.”

12. Using the fluorescent light as the source of light, give these directions: “Use the quadrant you previously labeled #5. Draw a square sitting on the bottom line of the quadrant. The sides can be any length of your choosing.”

13. Debrief the exercise with the learners. It should be obvious to everyone that the light in the room improved as we worked with the various methods of lighting, and that improved lighting made the work that we did easier, faster, and more accurate. The practitioner should try to help the learners expand this concept to other examples of how improved technology leads to improved productivity.

Assessment
Have learners write an essay discussing their insights as to how improved technology can improve productivity in the workplace.

Practitioner Reflection
Learners didn’t seem to give much consideration to there being a “better way of doing things.” Quality of work sometimes suffers when learners don’t have the proper tools or supplies or when their methods are inefficient.

The learners did the activity and could easily see how difficult it would be to work in an area with just one candle or the light of a coal oil lamp. They could see that through the advancement in lighting there were improved working conditions in the work place.

I would not change anything in this activity because it was a very good activity to demonstrate various things that can be done in the work place to improve working conditions. Lighting is but one example that can be used to show various improvements in the work place.
When a car won’t start, or when the battery appears not to be charging, the driver often thinks a new battery or alternator is required. Neither may be the case. This activity suggests a procedure for “shade-tree mechanics” to use in diagnosing the problem.

Learning Objective
- Learners will observe safety procedures.
- Learners will identify drive belts, alternator, battery, starter motor, spark plugs, spark plug wires, and cooling fan in a car.
- Learners will gain practical experience in using wrenches, checking belts for wear, tightening drive belts, disconnecting and removing batteries, checking and/or replacing spark plug wires, and checking and/or replacing spark plugs.
- Learners will be able to explain the function of the battery, alternator, starter motor, spark plugs, belts, and cooling fan.
- Learners will follow written and flowchart procedures to diagnose a car non-starting problem.
- Learners will recognize whether or not they might be interested in auto mechanics as a career.

KSAs: Accurately performs work; follows instructions; knows standard procedures; quality in the workplace; reads work-related text; listens for understanding.

SCANS: Basic Skills: reading, listening, writing; Information Skills: acquires and evaluates information, organizes and maintains information, interprets and communicates information; Personal Qualities: self-esteem, self-management; Thinking Skills: decision making, problem solving, reasoning, seeing things in the mind’s eye.

Subjects
- Critical thinking
- Consumer education
- Employability
- Job skills
- Life skills
- Problem solving
- Reading comprehension
- Technology
- Vocabulary development
- Work environment
- Writing skills

Activity Description
Most adult learners now drive cars, or will in the future. At some time(s) in their lives the car won’t start, or the lights will grow dim. They have a
choice of diagnosing and fixing simple problems themselves at relatively low cost or of spending the money to be towed to a garage to have the problem fixed. This activity is directed toward providing adult learners with the background and experience necessary to diagnose the most frequent problems: battery, corrosion, belts, and alternator.

Some of the learners may have an interest in becoming an auto mechanic. This activity may help them decide to do this or not.

**Background and Overview.** My background for attempting to teach this activity is a “lifetime” of trying to maintain my own cars (not always successfully). My approach is to try to use logic (and sometimes trial and error) to identify the source of the problem. If I do take a car to a garage, I always try to debrief the mechanic who did the work to find out why it was done and what reasoning led him to do it. The idea for using Coca-Cola came to me in this way from *The Ed Jones Texaco* in Crossville, Tennessee. It was a complete surprise to me, but it works.

This activity will take many class sessions to accomplish. It is composed of several sections. The first section is the academic part that takes place in the classroom when I introduce the idea of working on cars and start providing background that the adult learners will need to know. The second section is actually under the hood of a car. We do not have any not-starting cars sitting in the parking lot, so we will work on one that does start (or at least it will start before we work on it.) My goal here is to get learners thinking enough about the problem, and comfortable enough with actually getting under the hood and on the end of a wrench, that they will try it themselves the next time one of their own cars does not start.

These first two sections of the learning activity are described below. The third section is only hinted at here through the handouts, and is the actual diagnostic procedure that takes place when one of their cars won’t start. The learning activity has been a success if they try the diagnostic procedure on their own in an attempt to diagnose the problem when they do have a car that won’t start. I make no claim that the diagnostic procedure presented as a handout will work in all cases, but believe it will be a good start. People who try to follow it may learn ways in which it should be modified to be more useful (or even more correct). But this is true of all of life.

Possibly some practitioners will feel uncomfortable with this activity but I believe they will be rewarded with an education, a feeling of accomplishment, hopefully some money saved, and dirty hands. Very possibly there will be one or more learners in class who will be able to help teach the teacher in various ways. Here, then, are the steps for this learning activity.

**In the Classroom.** Lecture with opportunities for questions and discussion.

1. Describe the activity and its purpose.
2. Go through a careful discussion of WARNINGS (see below). Give each learner a copy of the safety warnings (*Handout 5*).
3. List the kinds of common problems the procedure is intended to diagnose: battery, alternator, corrosion of electrical contacts, starter motor, spark plugs and plug wires, and loose or broken belts and wires, and go into some detail on each
the consequence of each source of trouble.

4. I would present a brief explanation of how an engine operates, and the relationship of the items in 3 above to its operation so the class understands how everything works together, and what happens when one of the items does not function correctly.

5. Finally I will go through a detailed explanation of the flow chart along with the written diagnostic procedure so learners will understand the logic of the diagnostic process.

**Under the Hood.** Demonstration with “hands-on” participation of all learners

1. The first step is to show how to release and raise the hood since some learners may never have done this.

2. The second step is to identify all the parts of interest to the learners. I might use at least two cars to do this since different makes have the parts in different places, but the parts usually look similar even if in different places.

3. Once more, I will go through a discussion of safety, and of the reason for careful recording of which spark plug wire goes to which spark plug.

4. The next step is to see how to inspect the belts, both condition and tension. If the underside of a belt is cracked (across the belt rather than along it) it should be replaced. This leads to an actual demonstration of how to replace it and how to tension it correctly. Tension can be checked in two ways: the belt should feel tight if pulled outward; with hood and front windows open and the transmission in neutral, step sharply on the accelerator for just a moment and listen for a squeal. If you hear one, shut off the engine and tighten the belt some more. The squeal is produced by a loose belt slipping on one or more pulleys. Here each make of car will be different in detail but similar overall. Belts, spark plugs, and spark plug wires are the least expensive parts to replace so I always check them first. So here I will get out the wrenches and give each of the learners an opportunity to get dirty hands.

5. The belt exercise will be followed by an inspection of the alternator and a discussion of how to remove it should this ever be necessary. I will

---

**Safety Warnings:**

(Also available as *Handout 5* to copy for learners)

1. Batteries contain a highly reactive acid. Occasionally batteries explode. People working on or around batteries should always wear safety glasses.

2. Batteries generate a highly flammable gas. People working on or near them should not smoke or do anything which would generate sparks or fire.

3. When working on engines, wear tight fitting clothes, and keep hands and clothes well clear of belts and cooling fans. Never touch a belt or a fan when the engine is running. Some cooling fans are thermostat operated and can turn on even if the engine is not running.

4. Bolts holding cable contacts onto batteries with side terminals screw into threads cut into lead. These threads can be stripped (and the battery ruined) if too much force is applied with a wrench. To avoid this damage, use a short wrench to remove these bolts. Notice carefully how much torque is required to remove them and do not exceed this torque when tightening the bolts WITH THE SAME WRENCH. If you find that one bolt was loose when disconnecting the cables, test the other one to determine the correct torque to use.
not attempt to remove it since this could take longer than I would like to devote to it.

6. After the alternator exercise has been completed, we will start on an inspection of spark plug wires and then spark plugs. We will actually remove and replace a wire or two and a plug or two so that everyone will have this experience. We will inspect the plugs to see what their condition is and how to regap them. I will take a new and a badly fouled plug so the class will be able to see what “bad” is. They can re-gap the fouled plug.

7. Next we will go after the battery. The first step is to find it. On some cars this may take some investigation, but it is a reasonably large lump and has large wires running to it. As a last resort, follow the large wires to a fairly large lump which probably will be the battery. All batteries look about alike. They do differ a bit in size and shape, and whether the terminals are on the top or on a side.

8. We will determine how to get to the battery since many now are hidden under a structural bar that must be removed to get a good look at the battery or to replace it. Once we have removed any structure above it, we can examine the wires that attach to it. With luck, on someone’s car, we may even see some corrosion at the terminals and will be able to show how to remove it.

9. We will actually remove a battery so that the class will see how this is done (and appreciate how heavy a battery is). With the battery out of the way, we should get a good view of the starter motor so the class can see what it looks like, and how wires attach to it.

10. Then we will clean all corrosion off the battery and cable terminals using Coca-Cola (use plastic cup for Coca Cola and soak parts until bubbling stops.) Then we will re-install the battery and all structural members. We will start the car to verify that it still runs. This should complete the exercise.

Diagnosing a Car Non-Starting Problem.
This part of the activity has to wait for the availability of a non-starting car.

Assessment
The practitioner should observe carefully the activity under the hood as it progresses for two reasons: (1.) safety warnings absolutely must be followed at all times, and (2.) each learner must be assured a chance to handle wrenches, check belts, etc. Safety precautions and access to the experience are two of the objectives for this activity and can only be assessed by practitioner observation. Part of this learning activity will not take place until one of the learners has access to or responsibility for a car that will not start. We will have discussed how to follow the narrative and flow-chart versions of the diagnostic procedures, but learners can demonstrate that they can follow written and flow-chart procedures only during the course of the work on a car that won’t start.

In addition to practitioner observation for assessing objectives, learners should be asked to write a report describing the function of the battery, alternator, starter motor, spark plugs, belts, and cooling fan. Learners can also be asked to correctly identify these components in a car we have not worked on.

Practitioner Reflection
I have none at this time. I will not undertake this activity until we have warm weather.
Written Diagnostic Procedure for Diagnosing a Car Non-Starting Problem

NOTE: Do each instruction sequentially (i.e., one after the other without regard to numbering) unless directed to go to another number. Some instructions are numbered out of sequence. Ignore this and do them sequentially unless directed to go to another number. A flow chart showing these steps is also provided for those who find flow charts easier to follow than text. It may be helpful to follow them together.

_______________ Begin Activity _____________________

1. Try to start engine.

2. Does the engine crank? (Don’t confuse a starter motor running with an engine cranking. If the drive belts move when you try to start the car, you will know that the engine is cranking. If the drive belts are not moving, the engine is not cranking even though the starter motor may be running.)
   —If “no,” go to 3.
   —If “yes,” go to 6.

3. Does starter motor run?
   —If “Yes,” go to 3 in Battery Check.
   —If “No,” go to 4.

4. Was Loose Wire Check done?
   —If “No,” go to Loose Wire Check.
   —If “Yes,” go to 12.

6. Does engine start?
   —If “No,” go to 7.
   —If “Yes,” go to 10.

7. Was Spark Plug Check done?
   —If “No,” go to Spark Plug Check.
   —If “Yes,” go to 9.

9. Easy tests are completed. Take car to garage for diagnosis. END OF TEST.

10. Turn on lights.

11. Are lights bright and steady when engine idles?

12. Was Corrosion Check done?
   —If “No,” go to Corrosion Check.
   —If “Yes,” go to Battery Check.

16. Electrical system OK. END OF TEST.

_______________ Loose Wire Check _____________________

17. Check for loose/broken wires at battery, alternator, and starter motor. Also check for broken or loose belt which drives the alternator.

18. Tighten any loose wires and belts; replace any broken wires and worn or broken belts.

Go to BEGIN ACTIVITY.

_______________ Corrosion Check _____________________

19. Remove battery cables from battery.

20. Soak cable connectors and battery terminals in Coca Cola (use plastic cup for Coca Cola) until bubbling stops.

21. Re-connect battery cables to battery by attaching ungrounded cable first.

Go to BEGIN ACTIVITY.
Spark Plug Check

23. Do spark plug wires look okay? (They should fit tight on the spark plug, appear to have no burn marks, and appear not to be broken)
   —If “No,” go to 25.
   —If “Yes,” go to 24.

25. Replace the wires one at a time. Use your notes to see which wire goes to which plug.

24. Remove and check each plug one at a time. If the terminals appear to be very black with carbon build-up, they should be replaced. Keep careful notes of which wire goes to which plug; do not trust your memory. If necessary, attach a piece of tape to each wire on which you can write a note stating which plug the wire goes to. Check the spark gap, and re-gap if necessary.

26. Do the plugs look okay? (If the ends are real black, they should be replaced.)
   —If “No,” go to 27.
   —If “Yes,” go to 28.

27. Gap and install new plugs (engine should be cool; do not over tighten; make them only as tight as the ones you removed).

Battery Check

30. Does the engine crank?
   —If “No,” go to 29.
   —If “Yes,” go to 45.

29. If the loose wire check has not been done, do it now. Then attach jumper cables and try to start engine.

42. Does the engine crank?
   —If “No,” go to 31.
   —If “Yes,” go to 33.

31. The battery may have a short circuit. Remove jumper cables. Take battery to Autozone for free test. Then go to 32.

32. Is battery okay?
   —If “No,” go to 33.
   —If “Yes,” go to 35.

33. Remove jumper cables, if still attached. Install new battery. Go to 30.

35. Possible starter motor problem. Have it checked.

36. Is starter motor okay?
   —If “No,” go to 37.
   —If “Yes,” go to 9 in Begin Activity.

37. Install new starter motor.

44. Turn on lights. Are lights bright and steady when engine idles?
   —If “No,” go to 43.
   —If “Yes,” go to 47.

43. Possible alternator problem. Check to see that alternator spins when engine is running.
   —If “No,” tighten the belt that drives it and go to 44.
   —If “Yes,” drive the car to Autozone for a free test of alternator. Then go to 40.

40. Is alternator okay?
   —If “No,” go to 41.
   —If “Yes,” go to 9 in Begin Activity.

41. Install new alternator. Go to 30.

47. Battery and alternator okay. Go to 16 in Begin Activity.
**Begin Activity**

1. Try to start engine

2. Engine cranks
   - Yes
   - No
     - No
     - Yes
       - Go to 12

3. Starter motor runs
   - Yes
     - Go to 37 in Battery Check
   - No
     - Go to Loose Wire Check

4. Loose Wire Check done
   - Yes
     - Go to 12
   - No
     - Go to Loose Wire Check

5. Spark Plug Check done
   - Yes
     - Go to Spark Plug Check
   - No
     - Go to 37 in Battery Check

6. Engine starts
   - Yes
     - Go to 37 in Battery Check
   - No
     - Go to Loose Wire Check

7. Easy tests completed. Take car to garage for diagnostics. End of tests.
   - Yes
     - Go to 12
   - No
     - Go to 12

8. Go to 12

   - Yes
     - Go to 12
   - No
     - Go to 12

10. Turn on lights
    - Yes
       - Go to Corrosion Check.
    - No
      - No
      - Yes
        - Go to Battery Check.

11. Lights bright & steady when engine idles
    - Yes
      - Go to Corrosion Check.
    - No
      - Go to Corrosion Check.

12. Corrosion Check done.
    - Yes
      - Go to 12
    - No
      - No
        - Yes
          - Go to Battery Check.

13. Go to Battery Check.

14. Go to Corrosion Check.

15. Engine idles
    - Yes
      - Electrical system okay. End of test.
    - No
      - Yes
        - Go to Battery Check.
      - No
        - Go to Battery Check.


17. Check for loose or broken wires at battery, alternator, and starter motor.
Check for loose or broken belt which drives the alternator.

18. Tighten any loose wires or belts. Replace any broken wires or belts.
   - Go to Begin Activity
Possible alternator problem. Drive car to Autozone for free test of alternator.

- Battery okay?
  - Yes: Batteries and alternator okay. Go to 16 in Begin Activity
  - No: Alternator okay?
    - Yes: Start motor okay?
      - Yes: Go to 9 in Begin Activity
      - No: Go to 10 in Begin Activity
    - No: Replace starter motor. Go to 37.

- Engine cranks
  - Yes: Go to 33.
  - No: Install new battery. Go to 30.

- Lights bright and steady when engine idles
  - Yes: Go to 10 in Begin Activity
  - No: Go to 16 in Begin Activity

- Engine starts
  - Yes: Go to 9 in Begin Activity
  - No: Replace starter motor. Go to 37.

- Battery Check
  - No
  - Yes: Yes

Battery Check

Lesson 15 - Handout 3
LESSON 15—HANDBOOK 4

Corrosion Check

Remove battery cables from battery

Spark Plug Check

23
Remove battery cables from battery
24
Remove and check each plug
25
Replace wires
26
Plugs look okay
27
Replace plugs
Yes
No
Go to Begin Activity

Soak cable connectors and battery terminals in Coca-Cola until bubbling stops

Reconnect battery cables to battery by attaching ungrounded cable first

Go to Begin Activity

20
21
22
Yes
No
Safety Warnings

1. Batteries contain a highly reactive acid. Occasionally batteries explode. **People working on or around batteries should always wear safety glasses.**

2. Batteries generate a highly flammable gas. **People working on or near them should not smoke or do anything which would generate sparks or fire.**

3. **When working on engines, wear tight fitting clothes, and keep hands and clothes well clear of belts and cooling fans. Never touch a belt or a fan when the engine is running.** Some cooling fans are thermostat operated and can turn on even if the engine is not running.

4. **Bolts holding cable contacts onto batteries with side terminals screw into threads cut into lead. These threads can be stripped (and the battery ruined) if too much force is applied with a wrench. To avoid this damage, use a short wrench to remove these bolts. Notice carefully how much torque is required to remove them and do not exceed this torque when tightening the bolts with the same wrench.** If you find that one bolt was loose when disconnecting the cables, test the other one to determine the correct torque to use.
Searching for Dream Homes on the Internet

Adult learners will successfully navigate the Internet and employ research skills to select their “dream home.” They will also research housing costs.

**Learning Objective**
- Learners will find and navigate a recommended Internet site to locate information.
- Learners will print a copy of an Internet page.
- Learners will be able to decode the Internet Multiple Listing Services (MLS).

**Work-Based Skills**
**EFF Skills:** Lifelong Learning Skills: use information and communications technology, learn through research.

**KSAs:** Accurately performs work; Follows instructions; Knows standard procedures.

**SCANS:** Information Skills: uses computers to process information, acquires and evaluates information, organizes and maintains information, interprets and communicates information; Technology Skills: selects technology, applies technology to tasks.

**Subjects**
- World Wide Web
- Technology
- Job skills
- Consumer education

**Activity Description**
The learners were already familiar with the job responsibilities of a realtor due to previous lessons in this series. I thought it would be interesting for them to price their “dream home.” I had each learner use the Internet to find that information.

1. Ask the learners to refer to their home buying “needs” list they made in the first lesson of this series.
2. Distribute a local Home Guide to each learner, or pair of learners.
3. Explain that all the different realty companies list their houses for sale in one big listing called the Multiple Listing Service, or MLS.
4. Ask learners to choose a home based on their needs instead of wants. If there is a MLS number at the bottom of the ad, have the learner copy it down or circle it.
5. Help learners decode the ads using the Code sheet. (Unfortunately, there are no standard abbreviations for housing ads. The attached Handout 1 of Sample Housing Abbreviations should be of some help.)

**Project**
This learning activity was part of the project sponsored by the Fannie Mae Foundation to prepare Families First recipients for home ownership and an action research grant given by the Tennessee Department of Human Services to create work-focused Families First classrooms. This activity was the third of three in this series:
1. Determining Needs vs. Wants
2. Realtor Role-Play
3. Searching for Dream Homes on the Internet

**Materials and Resources**
1. Home Guides (These may be picked up for free at local convenience stores and grocery stores.)
2. Computer with Internet access (The local library may have one that your learners can use if one is not available in the classroom.)
3. List of common abbreviations used in housing ads (Handout 1).
4. Learner’s list of home features based in individual

Families First is the Tennessee program to provide training for those welfare recipients who lack basic education skills. While learners do work toward a GED, emphasis in these classes is shifting toward the knowledge, skills, and attitudes learners need to acquire and keep a good job.
needs (as created in the first learning activity in this project.)

**Name(s) of file(s) uploaded**

*Handout 1: Sample Housing*

**Abbreviations**

**Learner Level**

Grade levels 6.0 – 12.9

**Learner Grouping**

Individual

**Time Needed**

30 minutes per learner

**Setting**

I had eight Families First adult learners who participated in this lesson. We were studying the Fannie Mae Curriculum, “How to Buy Your Own Home.” Six of the eight learners were studying for their GED. All learners were trying to attain skills necessary for the workplace.

6. Each learner will go to www.realtor.com on the Internet. Using the mouse, click “Find a Home.” Learners may search for a home in Tennessee or any other state. Select the state in which the learner wishes to search. Then select a region. This should bring you to a form page where the learner may select information to find their dream home. If you did lesson one in this series, “Determining Needs vs. Wants,” the learners may refer to the “needs” list they have already compiled.

7. Have the learners conduct a search for the home. If it comes up, you may want to take a virtual tour (if the program has already been downloaded.) Learners should print the listing(s) of homes that interest them and that meet their needs. The prices should be listed with the homes. Ask the learners to compare prices of their homes.

**Assessment**

If the learner has at least two “dream homes” printed out, he/she will have completed the learning goals successfully.

**Practitioner Reflection**

This activity was enjoyed by all. I even had some learners come in the next day and want to find more homes on the Internet! One learner (who had just bought a computer) went home and tried to find a home on the Internet. The activity was a fun one and very relaxed. Some learners wanted to really dream “big” after they found their realistic “dream home” based on their needs. Once the learners get started, they wanted to keep finding homes. I had to limit the amount of time spent on this activity due to the fact that we only had one computer with Internet access. We actually worked in groups of four on one computer where the others watched while one person was on the computer. They looked for homes in Alabama, Tennessee and Florida.
Dream Homes on the Internet

Sample Housing Abbreviations

BR — Bedroom
BA — Bathroom
3/2 — 3 bedrooms and 2 baths
CH/A — Central Heat and Air Conditioning
AC — Air Conditioning
lg — large
gr rm — great room
dr — dining room
gar — garage
fpl — fireplace
hdwd — hardwood floors
cpt — carpeting
sqft — square feet