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ABSTRACT

This is the final report of a cooperative basic skills and literacy project of El Camino College (California) and two companies, BP Chemicals/Hitco Inc. and a division of the Hughes Aircraft Company. An extension of an earlier workplace program with BP chemicals, the program provided basic mathematics, reading, and English-as-a-Second-Language (ESL) instruction for company employees with limited skills in those areas. All classes were held at worksites. The original four-course core curriculum was expanded to include vocational ESL (business communication, both reading and writing), a three-tiered technical mathematics curriculum, team-based organizational leadership skill development, study skills, introduction to computer fundamentals, and a course in customized computer software. The report gives an overview of project design and content, outlining specific goals, related performance objectives, and activities undertaken to meet them, participant demographics, a brief evaluation of project effectiveness, and notes on outside evaluation efforts. It is concluded that the project achieved its primary goal and incorporated some important innovations. Appended materials include instructional materials for students, materials designed for trainer and supervisor workshops, student forms and data used for planning, a survey form, and participant and supervisor evaluation forms. (MSE) (Adjunct ERIC Clearinghouse on Literacy Education)

EL CAMINO COLLEGE

BASIC SKILLS FOR QUALITY PROJECT

FINAL REPORT

U.S. Department of Education

National Workplace Literacy Partnership

with

BP Chemicals/Hitco, Inc.
&
Hughes Aircraft Electron Dynamics Division

AWARD# V198A20082-92

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BASIC SKILLS FOR QUALITY PROJECT

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between El Camino College, BP Chemicals/Hitco, Inc., and Hughes Electron Dynamics Division.
Sponsored by the U.S. Department of Education.
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Project Description

The Basic Skills for Quality Project, or as it became more familiarly known, the Competitive Skills Project II, proposed to build on the Competitive Skills Project (CSP I), a successful workplace literacy partnership between El Camino College and BP Chemicals (Hitco). Through analysis of data gathered and expertise gained over the two year span of the CSP Project, the demonstration model was expanded to include Hughes Aircraft Electron Dynamics Division of Torrance, California.

While the Project realized the majority of it goals and objectives and implemented its proposed innovations, the term of the Project coincided with an economic recession in Southern California that delayed the delivery and limited the range of the Project's customized programs. Both business partners were severely affected by reductions in defense contracts and went through significant restructuring and downsizing efforts during the course of the Project. As a result of the delays in implementation, the Project was forced to apply for two six-month no-cost extensions to perform planned Project activities. With the extensions, the Project term ran from May 1, 1992 to October 30, 1994.

The Project focus, as with the CSP, was the implementation of quality production principles through instruction in workplace basics as defined by the American Society for Training and Development and the U.S Labor Secretary's Commission on Achieving Necessary Skills.

The touchstone for all instruction provided in the Basic Skills for Quality Project was industry's drive to implement quality management principles and technological innovations to remain/become globally competitive. Core curriculum, which integrated Total Quality Management principles into basic skills instruction, developed for BP Chemicals employees was then adapted to fit the Hughes environment. At Hughes EDD the quality program was called Continuous Measurable Improvement, and the titles of the earlier classes were customized for the Project to reflect their particular quality focus (without offending the participants): "Building Blocks of CMI" (Basic Math), Managing EDD Paperwork" (ESL and Reading Skills).

The targeted population was hourly and salaried, non-exempt, employees at Hughes and BP Chemicals in line production, fabrication, test inspection, and operational categories. All production lines targeted for the Project were affected by the downsizing efforts at the companies. This resulted in increased employee workloads and lowered morale.

Workers were identified that would most benefit from training through interviews with workers and supervisors, and individual assessments using both standardized (ABLE) and customized instruments. Those workers who had weak reading, writing and/or math skills (with/without a high school diploma), or who did not speak English as their first language were recommended to participate in the training.

All Project classes were held at the partners' worksites and the scheduling of classes presented some of the Project's greatest challenges. Both companies struggled to honor the release time commitment while facing heavy production loads with reduced workforces. It was much like the predicament of the adult learner who recognizes a need to develop their basic skills for long term success, but hasn't the energy or the time necessary when faced with the pressures of immediate survival. The two business partners were often forced to delay class start-up or limit the length of training to meet their production demands.

Partner Description

Hughes Electron Dynamics Division

The Hughes Electron Dynamics Division is a part of the Industrial Electronics Group of Hughes Aircraft Company. The group supplies components and subsystems to other Hughes groups, General Motors, and the commercial and defense aerospace industry. The products center on vacuum technologies and processes, cryogenics, thermal control devices, and energy storage devices. These products include microwave traveling-wave tubes, traveling-wave tube amplifiers, and cryogenic and thermal control devices and batteries.

At the time the Project was proposed, Hughes EDD had over 1200 employees housed in 670,000 square feet spread over three buildings. The Project was targeted for 260 of the 550 employees in four product lines as well as several support organizations. The product lines included: Power Amplifier, Helix and Space Amplifier, Energy Storage, and Thermal Products. Each product line has engineering, testing, and manufacturing functions. The facilities department, also included in the Project target population, handles maintenance and repair of the plant buildings. The total hourly workforce at Hughes EDD is 58% male and 42% female. Over 55% of these workers are from various minority groups.

By the time the Project was completed, the Hughes EDD workforce had been reduced by 395 employees and had closed one of its facilities. Also adversely affecting the Project was the loss of the leader of the Project Planning Team at Hughes, Roger Prochazka, who retired voluntarily to contribute to the division's cost cutting. The loss of the corporate champion midway through the Project resulted in slowed momentum and delayed decision making.

However, the realized commitment was always paramount.

BP Chemicals/Hitco Inc.

BP Chemicals/Hitco Inc. is a composites manufacturer making both defense and commercial applications. The company is a medium size employer with approximately 670 workers and facilities located in Gardena and Santa Ana, California. It is an important supplier to aerospace companies located in the Los Angeles area. Typical products include radar domes for aircraft, wiring insulation, jet fighter and race car brakes.

At BP Chemicals, the Project continued to target the group of 500 employees that management estimated could benefit from further basic skills instruction. The demographic breakdown of the targeted group was 67% male (72% minority) and 32% female (89.3% minority).

BP Chemicals (Hitco) also experienced on-going layoffs since the Project was proposed and at least 100 employees were laid off during the course of the Project. In addition, the Hitco division was up for sale for the greater part of the Project's duration creating an atmosphere of uncertainty among all the employees - line workers and management alike. Because of this uncertainty Project start-up and delivery was delayed and the scope of the Project restricted.

Following BP Chemicals' decision to keep the Hitco Division at the start of 1994, a renewed commitment to the Project's success was initiated and new curriculums were developed and delivered to the BP Chemicals' workforce.

El Camino College

El Camino College has taken a leadership role in providing workplace literacy programs among California's 108 community colleges. In addition to its experience conducting a National Workplace Literacy Grant (CSP I), the college has hosted a Workplace Learning Resource Center specializing in workplace literacy programs since 1991. El Camino is one of ten such Centers located at colleges throughout the state as part of the Chancellor's Office of the California Community Colleges Economic Development Network initiative (ED > Net). The Center conducts staff development inservices, develops curriculum, provides technical assistance and workplace training on a fee-for-service basis.

The Basic Skills for Quality Project benefited from its relationship with the Center through the use of customized curricula, which was developed as part of the Center's activities, and by drawing on its pool of quality trained instructors.

The educational partner, El Camino College, also experienced changes in leadership during the course of the Project. In January 1994, the Project Director, Kathy Lane, was replaced

by Cal Caswell, a faculty member with many years of experience working for aerospace firms. Mr. Caswell initiated the successful Technical Math/Blueprint Reading/Technical Writing curriculum and this revitalized the Project's programs that had stalled due to successive delays and changes.

This was also a difficult time for the College due to enrollment dropping by 6,000 students during the term of the Project along with California's on-going fiscal crisis which reduced the funding to the community colleges. Because of the many changes at the College, the Project moved its administrative offices twice while conducting Project activities, and therefore slowed the Center's forward progress somewhat.

Curriculum

Curriculum development was a continuous process throughout the Project. All four "core courses" developed as part of CSP I: Vocational English as a Second Language, Communication Skills for Quality, Math Skills for Quality, and Introduction to Computers were redesigned for the extended Project. New courses were also developed utilizing the respective Project Planning Teams at both partners. Many courses underwent revisions during the course of the Project to ensure positive measurable impact on participants. A case in point is the Math Skills for Quality curriculum originally developed for BP Chemicals. The initial focus of the class was to train participants in the basic math skills required in the implementation of quality principles, such as statistical process control (SPC). This was revised for Hughes EDD, and was titled "Building Blocks of CMI." In addition to instruction in basic computation skills, Ohm's Law and formulas for identifying capacitors to ensure relevance of content for the EDD electronic assemblers was introduced.

When company-wide downsizing revealed a skills gap in the employees' ability to interpret drawings on the shop floor, the course evolved into a three-tiered Technical Math curriculum: An introductory Technical Math course with a strong emphasis on fractions, decimals and percentages; an Applied Technical Math I class covering diagrams, chart reading, and beginning blueprint reading; and Advanced Technical Math Skills II class which presented more difficult material than level I and included instruction in ratios and proportions necessary for a thorough understanding of statistical process control.

At the close of the Project, the following courses had been developed and delivered:

- Vocational English as a Second Language: A reading course designed to assist the hourly employees whose native language is not English to understand the various forms of written business communication that they encounter on the job. The reading skills were contextualized within the business format and most of the curriculum was derived from actual work documents. A secondary objective of this course was to improve the employees' quality of life outside of the workplace through enhanced reading ability and appreciation for life-long learning.

- Written Business Communication: A course designed as an application-oriented "how-to" written business communication course intended to improve the writing of hourly employees. The course was designed at three levels to reflect the varying competencies required of the participants depending on job classification.

- Technical Math: A math course designed to teach basic arithmetic skills and the use of a calculator. The course was modified to reflect an emphasis on the mandatory competencies required of employees for both business partners in fractions, decimals, and percentages. The course also encouraged teamwork to solve problems and utilized quality vocabulary.

- Applied Technical Math I: This curriculum was designed for technical/blueprint readers as an eight week course covering mathematical problems, diagrams, charts and graphs. The course focused on those math and problem solving skills required for teamwork problem solving, computation skills, blueprint reading, technical element identification, and statistical process control.

- Applied Technical Math II: This course was designed to include more advanced material using principals and applications introduced in Course I and also included material on ratios and proportions necessary for a thorough understanding of SPC.

- Team-Based Organization Leadership Skills: The intent of this course was to help hourly employees understand the importance of teams and leadership in their working environment. The course covered measurable results, the benefits of working in a team environment, the qualities of a good leader, understanding the follower's role in leadership, the team environment (stress, conflict, creativity), and finally the integration of these topics to encourage the development of personal leadership skills.

- Study Skills: This subject material was designed to help hourly workers plan how to efficiently complete an assignment, within a reasonable amount of time, without having to give up their personal time. The course taught employees organizational skills, both personal and professional, along with a variety of study and test taking strategies.

- Technological Applications: This course was designed to give employees an introduction to computers and to develop an understanding of computer operation fundamentals. The course gave instruction in accessing and running job-site applications and alternative instruction delivery programs.

- Customized Computer Software: Instructional software was developed for

delivery in the on-site computer labs. A computer assisted instruction (CAI) program presenting quality principles was customized for each of the business partners. Programs were also developed to support instruction in the reading of charts and graphs and Time Management.

Project Design

GOAL 1: BUILD ON THE COMPETITIVE SKILLS DEMONSTRATION PROJECT TO EXPAND CIRCLE OF QUALITY TO HUGHES ELECTRON DYNAMICS DIVISION

Objective 1.1: Conduct Needs Analysis and Job Literacy Audit of Targeted Jobs at BP Chemicals and Hughes EDD

As proposed, a literacy audit was conducted at both business partners' worksites at the start of the Project. Employees, supervisors, and management personnel met with the El Camino staff to determine the best way to identify the skills gaps between the literacy competency level required of a specific job and the literacy skills of the employees. Job related written materials were gathered (manuals, company procedure communications, memos, etc.), targeted jobs were observed, and literacy tasks were documented for analysis.

Objective 1.2: Analyze Content Information and Difficulty Levels of Materials

The materials which were gathered were analyzed in terms of their use of vocabulary (technical terms and jargon), difficulty of sentence structure, format, and assumed background knowledge. Materials and tasks were analyzed to identify math ability required to perform the tasks successfully.

Objective 1.3: Conduct Preliminary Analysis of Language Proficiency, Literacy Levels, and Educational Background of Individual Workers

The preliminary analysis of perceived literacy levels of employees was conducted through interviews with managers, supervisors, and individual workers. Interviews were conducted by Project staff at both worksites (Hughes EDD: 7/92, BP Chemicals: 9/92). To determine accuracy of perceived literacy levels, a standardized assessment was proposed using selected modules of the Adult Basic Learning Exam (ABLE) as a benchmark of participant literacy levels to assist in the Project's design.

Objective 1.4: Establish the Curriculum Project Team to Guide the Development of Curriculum and the Direction of the Project

Project Planning Teams were established at both business partners to work with the college staff in design of the Project and the selected curriculum. The Hughes EDD team consisted of management representation from the human resources and quality control departments, supervisors, and a union representative. The BP Chemicals' team included representatives from human resources, the BP Chemicals training program, and a union representative. In addition, an advisory committee was established and met bi-annually, during the course of the Project, providing an opportunity for the two business partners to share experiences, concerns, and needs.

Cited in the proposal as one of the innovative features of the Basic Skills for Quality Project, the planning teams and advisory meetings were a critical factor in the Project's successes. They performed their intended function of designing the Project curricula, support services, and disseminating Project information while providing a forum for communication between management and workers that had not existed before.

The meetings also provided an opportunity for the business partners and educational provider to work out their often divergent perceptions of worker needs and program effectiveness. From this experience a conference workshop was developed titled "When Worlds Collide: The Business/Education Partnership" which was presented at the Fifth Annual Economic Development Conference of the Chancellor's Office of California Community Colleges.

At the start of the Project, the teams met frequently (at Hughes EDD, the new partner, the team met once a week for the first six months) to determine Project practices and content. Although union representation fell off once the Project was determined to be worker-centered and non-threatening, continued union and worker input was sought however to help direct the Project design. The union had significant impact on such issues as participant selection and confidentiality of participant records.

The company personnel who participated on the Project Planning Teams from both companies worked tirelessly to make the Project a success. All exhibited a strong commitment to Project success while remaining sensitive to the needs and concerns of their workers always taking care that the courses and content was not presented to workers as "remedial" or that participation was a form of punishment. Indeed, the word "literacy" was not allowed in any of the course descriptions disseminated to the workers, at either of the companies, nor was the proposed title of the Project "Basic Skills for Quality" ever widely used because of its remedial connotation.

GOAL 2: MODIFY AND EXPAND PROGRAM MODEL TO MEET PARTNERS' CHANGING NEEDS

Objective 2.1: Adapt Program Components

Successful program practices of the CSP I Project were revised and adapted for the new

partner, Hughes EDD. The program components were altered to reflect the changes in the BP Chemicals environment as well.

At the outset, the program plan consisted of these core classes: a) Individual computerized literacy instruction and b) Individual tutorial support. Both business planning teams agreed in principle to the design of the components, and the adaptation of specific elements was an ongoing function of the planning teams throughout the Project. Core classes were adapted and customized (course listings above), company specific computerized instructional software was developed, and a basic skills integrated learning system focusing on applied literacy skills was purchased for Project participants.

A significant formal tutorial program was on-going through the efforts of several instructors. The "Workplace Safety" along with Authorware applications to create a "Train-The-Trainer" self-help program was initiated during the course of the Project. Efforts were made by Project staff to initiate a program through distribution of tutoring materials to interested employees and through supervisor orientation workshops. Individual tutoring did occur on an informal basis among classmates and for participants who utilized the computer lab. The lab attendant was a literacy tutor trained in the Laubach method by the Literacy Volunteers of America. While there was initial enthusiasm expressed by some of the employees about tutoring their peers at the Project outset, interest trailed off as downsizing pressures adversely impacted the remaining workers' free time and morale.

Objective 2.2: Modify/Customize Course Curricula of Core Classes

The modification and customization of the course curricula was the primary activity of the Project Planning Teams throughout the Project. Course design always centered on the development of reading and math skills, print processing strategies, and interpretations of charts, graphs, and statistical designs within the functional context of the particular workplace. In addition, the processes of team work and problem solving to facilitate a quality work environment were incorporated into the courses to reflect a particular company quality philosophy.

In response to participant evaluations and feedback in Project team meetings, multi-level instruction was offered for some of the courses to alleviate difficulties encountered by instructors and learners alike in the multi-skilled classroom. Both the writing course and the math course were expanded into three levels of instruction to accommodate the different participant skills levels.

By Project end, adaptation and addition of curricula expanded the CSP I core curricula from four to eight regular class offerings (Appendix A).

Courses Offered By Basic Skills For Quality Project :

Vocational English as a Second Language
Written Business Communication (3 levels)
Technical Math
Applied Technical Math I
Applied Technical Math II
Study Skills
Team-Based Organizational Leadership
Technological Applications

Objective 2.3: Develop and Customize Content for Computer Lab

Computerized instructional lessons were developed for the computer lab in reading charts and graphs, basic math operations, and an instructional program in the total quality management principles. These having been developed as part of the CSP I for BP Chemicals, and then adapted for the Hughes EDD quality philosophy of continuous measurable improvement.

Through its connection to the El Camino Workplace Learning Resource Center, the Project computer labs also utilized literacy software developed by the Center in workplace safety, time management, and statistical process control.

Objective 2.4: Develop and Modify Curriculum for Workshop Sessions

The Project orientation workshops were developed for the participants, instructors, and supervisors. Participant workshops on educational experiences and expectations were introduced and continued in the form of focus groups that were held at the midpoint and at the end of each course.

Orientation workshops were established in workplace literacy for the purpose of informing instructors, who were developing their talent in workplace education, on the difference between the functional context approach to instruction and the academic approach that most community college instructors are accustomed to teaching.

An orientation for supervisors was developed which outlined a "Train-The-Trainer" approach whereby the supervisor can consider effective instructional techniques to become more of a teacher or coach than a drill sergeant. In the downsizing activity, it became quite apparent how important this concept was becoming as management had to deal with these workers more and more.

GOAL 3: DELIVER SERVICES

Objective 3.1: Disseminate Information to the Workforce

Information on the Project was disseminated to the workforce through the human resources departments of both companies, by division meetings, bulletin board postings, and announcements in the company newsletters.

Objective 3.2: Train Supervisors and Managers in Identifying and Referring Potential Students.

The Project Teams at both companies met with front line supervisors to get input on workers and to provide training in how to identify potential students. A supervisor workshop was held at Hughes EDD facility 11/18/92 (Appendix B) and participant evaluations were favorable and showed a sensitivity to worker needs.

As the Competitive Skills Project I was introduced, there were supervisors at both companies who resisted some of the aspects of the Project (release time for one) from its outset which delayed releasing of the employees to attend classes. Through interviews and responses to surveys it was determined that the supervisors resistant to the program generally believed that it would not have a significant impact on worker performance.

Objective 3.3: Conduct Orientation Session and Placement for Employees

Due to scheduling difficulties, the first meeting of workers and Project staff was (unfortunately) during the administration of the ABLE assessment instrument. While not an ideal introduction to the Project, every effort was made to present the Project design to the workers in a non-threatening manner assuring them that individual Project records were confidential.

A sample assessment of 45 employees was conducted at Hughes EDD in July of 1992 using the Reading Comprehension, Numbers Operations, and Problem Solving sections of the ABLE assessment instrument. The instrument delivered was the ABLE Level 2 which assesses skills roughly at the eighth grade academic level.

The ABLE assessment of the BP employees began in January 1993 with a sample group of 64 at their Santa Ana facility, and by the end of the Project all employees at both the Gardena and Santa Ana facilities had been assessed in Reading Comprehension, Numbers Operations, and Problem Solving.

Results of the assessments were reported to management in summary form. While participation in the Project was voluntary, some employees were recommended to take the class based on their performance on the ABLE assessment.

Objective 3.4: Conduct Orientation Session for Faculty and Support Staff

A schedule of monthly staff meetings was established at the start of the Project where instructors and Project staff would review Project developments and progress. Project staff and college instructors also attended the workshop held for Hughes EDD supervisors (11/18/93) and successful Project practices were featured as part of the Workplace L[illegible]ing Resource Center's staff development inservices (5/18-19/93, 2/24/94, 5/12/94).

Objective 3.5: Implement Instruction

The Project proposed four training cycles consisting of four classes of 50 hours duration with each cycle lasting nine weeks. This soon became unworkable for both of the business partners because of heavily impacted production schedules due to a downsized workforce. The Project Planning Teams at each company recognized that some subject areas require more time than others (e.g., English as a Second Language takes longer and more intensive instruction than Study Skills).

As the production schedules at both sites could not afford to lose more time than three hours per week, classes met an average of three hours a week for nine weeks. The ESL classes were extended to 12 weeks to permit 48 hours of instructional time.

Throughout the Project, losing the production time of the plant employees through the release time commitment to the Project presented a hardship to both companies. In January of 1994, the Hughes EDD plant production line was so severely stretched that the proposed round of Technical Math classes was canceled by Hughes management until employees agreed to contribute half of their own time to the class. Scheduling of classes for the Project had to be flexible for the Project to continue.

Most participants of the Project participated in three or more classes for an average of 108 hours of instruction for each trainee.

List of Classes and Dates Delivered

Building Blocks of CMI - Basic Math (Hughes EDD)	9/29/92-12/1/92
Building Blocks of CMI - Basic Math (Hughes EDD)	1/12/93-3/11/93
Vocational English as a Second Language(BP/Hitco)	1/18/93-3/31/93
Conquering EDD Paperwork - ESL Reading Skills (Hughes EDD)	3/23/93-5/25/93

Building Blocks of CMI (Hughes EDD)	4/5/93-6/7/93
Math Skills that Work (BP/Hitco)	5/7/93-7/28/93
Conquering EDD Paperwork (Hughes)	6/29/93-8/31/93
Technical Math (BP/Hitco)	7/21/94-9/10/93
Written Business Communication (BP/Hitco)	10/4/93-11/17/93
Applied Technical Math I (Hughes EDD)	1/24/94-3/24/94
Team Building and Leadership Skills (BP/Hitco)	2/28/94-4/25/94
Applied Technical Math I (Hughes EDD)	3/7/94-4/20/94
Applied Technical Math II (Hughes EDD)	3/8/94-4/21/94
Study Skills (BP/Hitco)	5/26/94-7/1/94
Applied Technical Math II (Hughes EDD)	6/21/94-7/28/94

Individual Education Plans

In addition to customizing curriculum, the Project proposed to provide individual education plans for participants to outline the goals and objective of each learner. The Project hired an educational advisor to interview participants and provide them with information and a plan for pursuing their personal educational goals (Appendix C).

Interviews with employees yielded some surprising results in the course of preparing the individualized education plans. Often it was the first time the employee had ever been asked to think about or verbalize personal goals. Also surprising was the high number of responses which indicated a minimal motivation to learn new skills that could increase an employee's chances of promotion.

Objective 3.6: Develop Participants' Skill in Workplace Literacy

Development of curricula and assessments that produced immediate quantifiable results was a challenge for the Project Planning Teams. Customized testing during course delivery showed increases in skill levels ranging from 15 to 45% improvement of some participants in the generalized skill areas of language based literacy, graphic literacy, and numeric literacy. The need for the Project to produce measurable results to justify company commitment became critical at midpoint of the Project and a greater emphasis was placed on numeric instruction which yielded more tangible and easily quantified results. The on-going revisions to the numeric classes came as a result of the effort to produce measurable data on Project progress while focusing instruction on skills that could be immediately applied on the shop floor (fractions, decimals, percentages). At the end of the Project, the Technical Math course was producing 30% gains in employee scores as measured by assessment and hands on application exercises.

The more intangible measures of Project effectiveness, such as participant and supervisor evaluations and focus group responses, were overwhelmingly positive about the success of

evaluations and focus group responses, were overwhelmingly positive about the success of the courses and the Project as a whole. Anecdotal evidence of increased decision making by employees who had attended was particularly encouraging to Project instructors and staff.

GOAL 4: INSTITUTIONALIZE THE PROGRAM

Objective 4.1: Incorporating Courses into College Curriculum

El Camino College is committed to developing the capacity to deliver innovative workplace literacy training programs through its hosting of a Workplace Learning Resource Center.

Expertise and resources gained through the US Department of Education literacy partnership with Hughes EDD and BP Chemicals (Hitco) have also been shared with the College's Adult Learning Resource Center. That Center provides basic skills education to students who need to raise their proficiency in basic skills in order to enroll in degree based college programs.

Objective 4.2: Company Commitment to Future Training

BP Chemicals and Hughes Aircraft's future commitment to providing training for their employees is evidenced by their continuing to contract with El Camino College's Workplace Learning Resource Center for training.

At Project end BP Chemicals contracted with the Center for additional training in ESL/English and Technical Math skills. Hughes Aircraft also contracted with the Center to provide customized Technical Math and Blueprint Reading training to employees of their Space and Communications Division.

GOAL 5: DISSEMINATION OF THE RESULTS

Objective 5.1: Project Staff Will Make Conference Presentations on the Project

Throughout the duration of the Project, the staff disseminated information on El Camino College's National Workplace Literacy Partnership Project with BP Chemicals and Hughes Aircraft through conference presentations at both state and nationwide conferences.

A conference workshop was developed from the partnership detailing the successes and some of the difficulties encountered in the education/business partnership entitled "Workplace Training and the Education/Business Alliance." Company representatives from BP Chemicals (Hitco) and Hughes EDD assisted in the development and delivery of this

workshop at two statewide conferences (ED>Net Fifth Annual Conference, 3/3-4/93; California Community Colleges Administrative Officers, 4/1-3/93).

Through the El Camino Workplace Learning Resource Center, information on the partnership Project was disseminated at all Economic Development Network (ED>Net) of California Community College's bi-annual Workplace Learning Resource Center meetings. This relationship provided a valuable opportunity for the sharing of experiences and best practices.

Conference Attendance

National Workplace Literacy Partnership Start-UP	5/27-29/92
ED>Net Workplace Centers Meeting	1/26-27/93
ED>Net Fifth Annual Conference	4/1-3/93
California Community Colleges Association for Occupational Education (CCCAOE)	5/13-14/94
ED>Net Sixth Annual Conference	2/8-9/94
28th Annual TESOL Convention	3/7-13/94
Fourth Annual Texas Workforce Consortium Conference	5/3-7/94
College Board Seminar "Doing Business with Business"	5/19-21/94
College Board Seminar "ISO 9000 for Service Orgs."	5/16-17/94

Objective 5.2: The Company will Publicize the Project

Information on the partnership was publicized through press releases and company newsletters by both business partners. In addition to participating in the preparation and presentation of conference workshops on the Education/Business alliance, company representatives attended business roundtable meetings to disseminate information about the literacy partnership.

The Quality Control Manager who participated on the Hughes EDD Project planning team, Roger Prochazka, appeared with then Project Director, Kathy Lane, on local television (KTLA) as part of its "Weekend Gallery" Labor Day Weekend '93 special series on the Los Angeles workforce.

Numbers Served By the Project

Data was collected on all participants served by the Basic Skills for Quality Project according to guidelines provided by the US Department of Education.

Assessments

BP Chemicals/Hitco	528
Hughes EDD	194
TOTAL	722

Employees Trained

BP Chemicals/Hitco	96
Hughes EDD	146
TOTAL	245

By far the most popular training of the Project was the Technical Math course with 142 participants trained in one or more of the three levels offered.

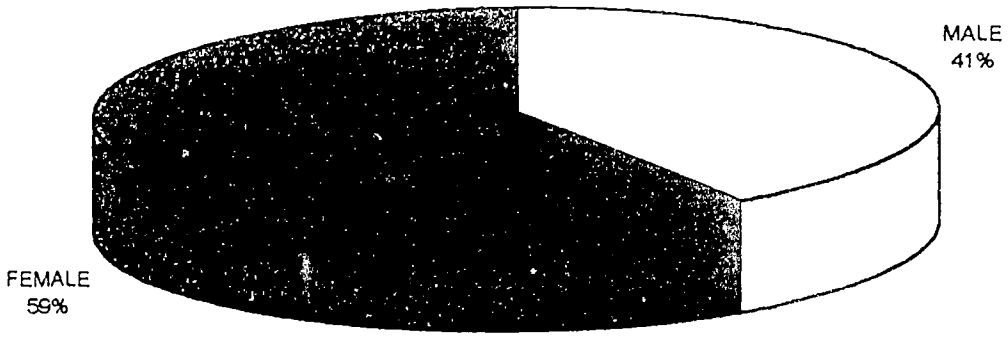
Participant Demographics

Anonymous demographic and educational data of class participants was collected by questionnaire (APPENDIX D) for approximately 75% of courses offered in the Basic Skills for Quality Project. Most trainees attended at least three of the classes offered and data presented below is a projection of percentages based on the total number of participants served.

Gender Breakdown

The participant gender breakdown for the Project ended up with a greater number of females trained (59%) to males (41%) reflecting the greater number of Hughes EDD employees (predominantly female electronic assemblers) who received training.

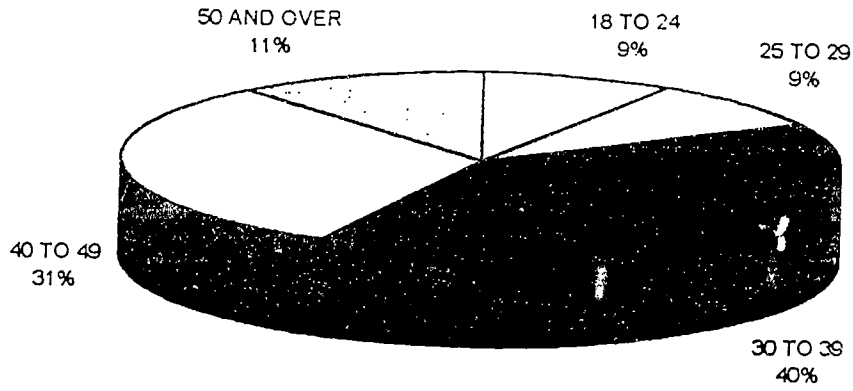
BASIC SKILLS FOR QUALITY PROJECT PARTICIPANT GENDER



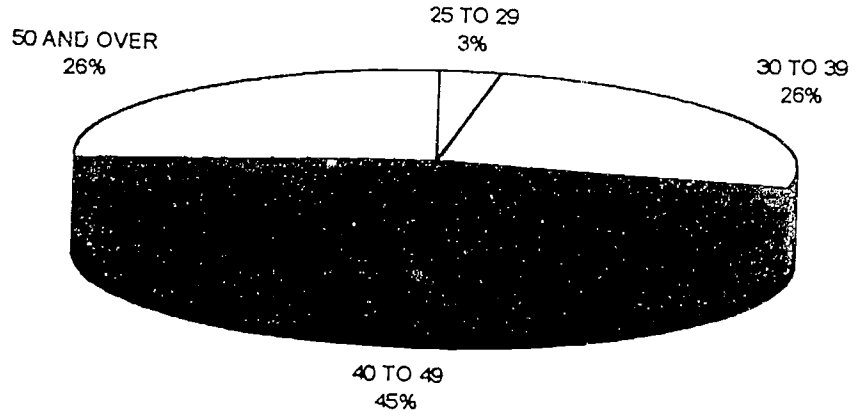
Age Distribution of Participants

Appearing below is the age distribution of those participants who received training broken down by company. The mean age group of total Project participants was in the 40 to 49 age cluster.

AGE DISTRIBUTION OF BP CHEMICAL PARTICIPANTS



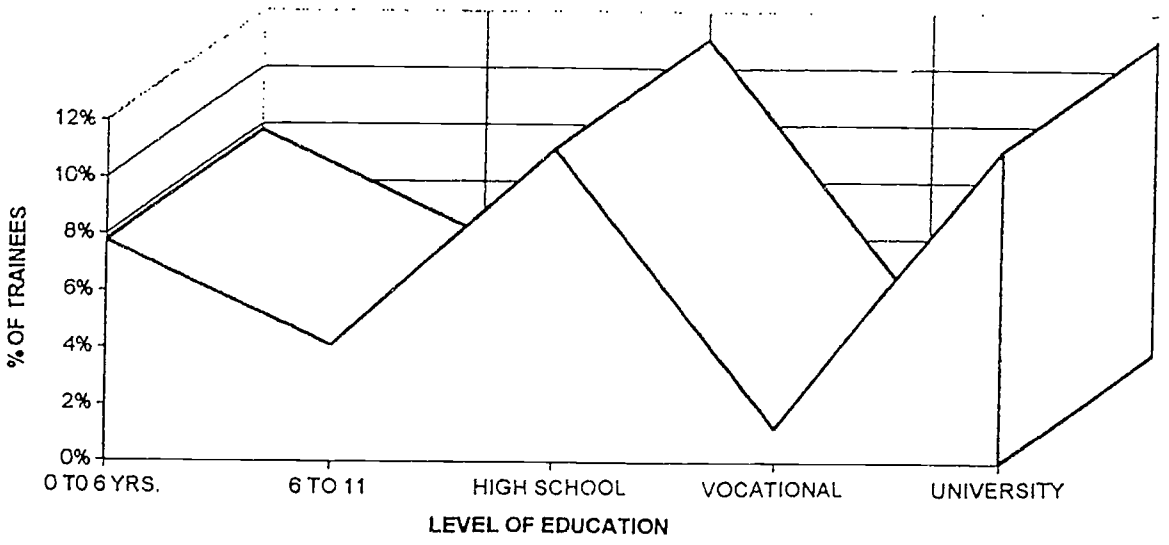
AGE DISTRIBUTION OF HUGHES PARTICIPANTS



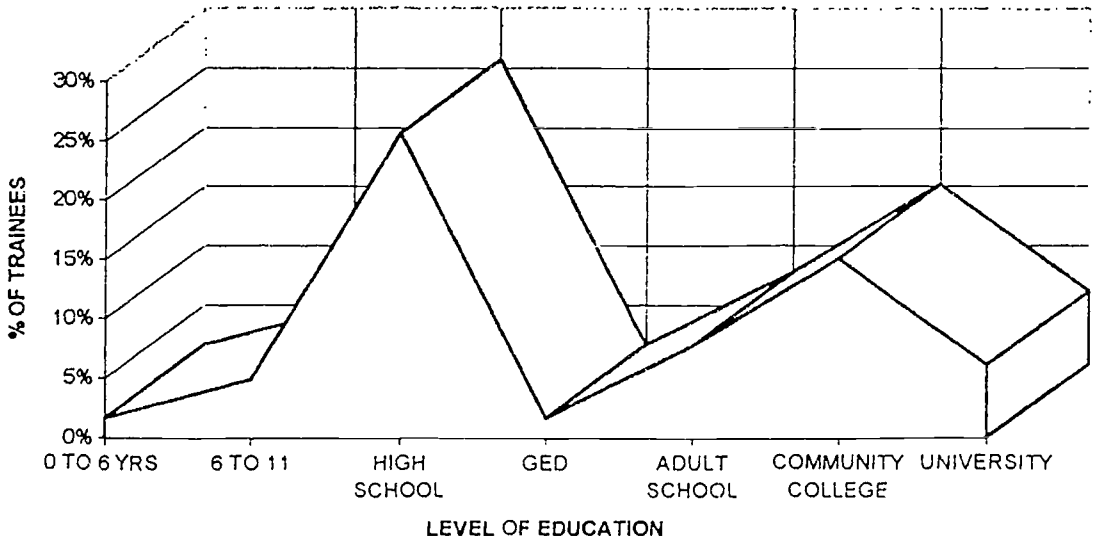
Level of Education

From data collected on levels of education achieved inside and outside of the U.S. it was determined the majority of Project participants had high school diplomas.

EDUCATION LEVEL ATTAINED OUTSIDE OF U.S.

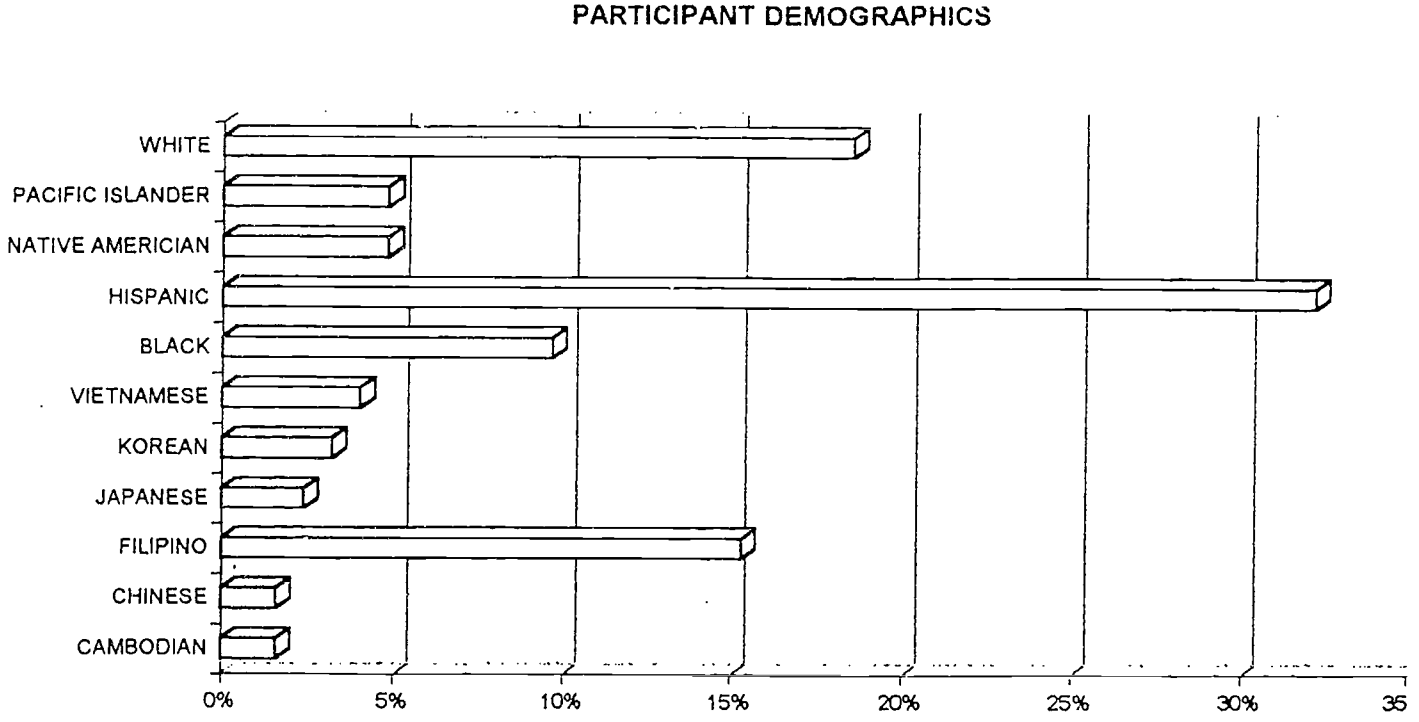


EDUCATIONAL LEVEL ATTAINED INSIDE U.S.



Ethnic Background of Participants

Data collected on the ethnic background of the participants is reflective of the multicultural workforces of both BP Chemicals and Hughes EDD. Not surprisingly for the Southern California area, the predominant ethnic group represented among the line workers was Hispanic.



Cambodian	2%
Chinese	2%
Filipino	15%
Japanese	2%
Korean	3%
Vietnamese	4%
Black	10%
Hispanic	32%
Native American	5%
Pacific Islander	6%
White	19%

Evaluation of Project Effectiveness

Participant evaluations were distributed at the midpoint and at the end of each class. In addition, supervisor evaluations were distributed to measure program effectiveness (Appendix E). The participant evaluations were overwhelmingly positive about course instruction and the Project in general. A consistent response in the participant evaluations were requests for more class time and additional courses. Supervisor evaluation responses to the Project indicated increased morale and communication skills of employees. Most importantly, the supervisors noted an increased ability and confidence in decision making on the part of line workers who had attended the Technical Math courses.

Confidence levels increased quite dramatically as evidenced by the focus groups, which were composed of the participants for each course, held following the graduation ceremonies for each and every course. These group discussions provided feedback on course design, effectiveness, and their sincere interest in more classes. Responses in the focus groups yielded many success stories of application of new skills at work, and also in the home, e.g. helping the kids with their homework.

Again, because of downsizing and restructuring efforts at both companies, the use of productivity levels and defect rates, as an accurate measure of Project success, was sometimes impossible as workers were suddenly transferred to other departments or department capacity was drastically depleted through worker layoffs. For those who were retained in a department, it was quite evident that their productivity was increased and defects decreased.

Outside Evaluation

As proposed, the Project contracted with an external evaluator to visit the Project and evaluate its effectiveness in raising the worker's basic skills.

The Project contracted with Heide Wrigley of Aguirre International to provide the external evaluation. Ms. Wrigley made an interim visit of three days to the Project during its first six month no-cost extension in March of 1994.

Ms. Wrigley interviewed participants, company supervisors, management, instructors and Project staff; and was able to determined that the Project was on track. She was favorably impressed with the new Technical Math, Applied Math and Blueprint Reading, and Team Leadership curricula which was in place; as well as the resources available to the learners through the computer labs in Workplace Safety and Basic Skills. Ms. Wrigley commented to Project staff that the Project had definitely taken a new course and had "turned the corner" under the new leadership of Cal Caswell. She recommended the Project be considered for an additional six month extension to finish up on the promised requirements.

Conclusion

Overall, the Project achieved its primary goal of establishing an effective workplace literacy program that yielded measurable improvements in worker performance and management confidence for its business partners, Hughes EDD and BP Chemicals (Hitco). At the very outset of The Basic Skills for Quality Project it seemed to fall short on two proposed goals and objectives: 1) The target number of participants served, and 2) The establishment of a significant individual peer tutoring program (Train-The-Trainer). However, as the new management increased partner confidence, increasing additional classes and frequency, those numbers quickly and aptly increased.

The following are the proposed innovative qualities that were all realized in the course of the Project:

1) Project Planning Teams were established at each company to steer, enhance and maintain Project design to its fullest magnitude,

2) All courses were developed, streamlined, and carefully organized around quality principles that reflected the specific direction and philosophy of the worksite; as well as precise applications for that environment,

3) Creating viewpoints as well as equitable atmospheres in which to work with management and employees, especially in the area of establishing non-threatening working relationships; allowing participants to feel a freedom and self-worth in learning, as well as treating all participants with concern,

4) Appropriate marketing of abilities, experiences, company needs and educational expectations,

and

5) Broadening elements of instruction as supported by customized computer software which was developed as part of the Project, and delivered in worksite computer labs which were fully established under the guidelines.

In addition to the benefits provided to the workers, lasting benefits attributable to the Project must include the expertise in developing and delivering workplace literacy training gained by the instructors, supervisors, company management, and Project staff; the curriculums developed as part of the Project are currently being offered by the El Camino College Workplace Learning Resource; and the software developed as part of the Project can be used by workers at the companies (which are continuing to be served), and also by adult learners seeking workplace oriented instructional software.

While it is unfortunate that economic conditions limited the reach of the Project during the first phase, which included multiple amounts of companies downsizing throughout the area, individual worker success stories abound in anecdotes from Project instructors, company personnel and Project staff attesting to the program effectiveness and its positive influence on the business partners and their employees.

The end result is without a doubt the extensive and educational opportunity which was experienced to help meet the needs of local businesses as they strive to maintain their market-share leading into the 21st Century, and the "new-world" of doing business. The confidence that this Workplace Learning Resource Center imparts on its business region is helping to impact how "business is doing business" while addressing the needs of "Workforce 2000."

FINANCIAL STATUS REPORT

(Short Form)

(Follow instructions on the back)

1. Federal Agency and Organizational Element to Which Report is Submitted	2. Federal Grant or Other Identifying Number Assigned By Federal Agency	OMB Approval No.	Page	of
U.S. DEPARTMENT OF EDUCATION ADULT EDUCATION ACT	V198A 20082-92	0348-0039	1	1 pag

3. Recipient Organization (Name and complete address, including ZIP code)

EL CAMINO COMMUNITY COLLEGE
16007 CRENSHAW BLVD.
TORRANCE, CA 90506

4. Employer Identification Number	5. Recipient Account Number or Identifying Number	6. Final Report	7. Basis
956001060	1-95.6001060-A1	☒ Yes ☐ No	☒ Cash ☐ Accru

8. Funding/Grant Period (See instructions) From: (Month, Day, Year)	To: (Month, Day, Year)	9. Period Covered by this Report From: (Month, Day, Year)	To: (Month, Day, Year)
05-01-92	10-30-94	05-01-92	10-30-94

10. Transactions:	I Previously Reported	II This Period	III Cumulative
a. Total outlays	0.00	605,152.	605,152.
b. Recipient share of outlays		153,985.	153,985.
c. Federal share of outlays		451,167.	451,167.
d. Total unliquidated obligations			0
e. Recipient share of unliquidated obligations			0
f. Federal share of unliquidated obligations			0
g. Total Federal share (Sum of lines c and f)			451,167.
h. Total Federal funds authorized for this funding period			451,170.
i. Unobligated balance of Federal funds (Line h minus line g)			3.

11. Indirect Expense	a. Type of Rate (Place "X" in appropriate box) ☐ Provisional ☐ Predetermined ☐ Final ☒ Fixed	b. Rate	c. Base	d. Total Amount	e. Federal Share
		8%	417,747.	33,420.	33,420

12. *Remarks: Attach any explanations deemed necessary or information required by Federal sponsoring agency in compliance with governing legislation.*

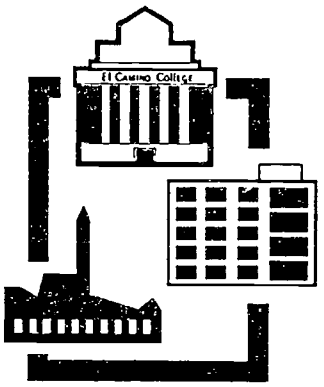
13. Certification: **I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays and unliquidated obligations are for the purposes set forth in the award documents.**

Typed or Printed Name and Title	Telephone (Area code, number and extension)
VICTOR HANSON, BUSINESS MANAGER	310-660-3152 BRENDA WILSON
Signature of Authorized Certifying Official	**Date Report Submitted**
Victor Hanson	01-31-95

Previous Editions not Usable

Standard Form 269A (REV 4-88)
Prescribed by OMB Circulars A-102 and A-110

APPENDIX A



Current Curriculum

Workplace Learning
Resource Center
A service of El Camino College

Math 1 - Technical Math Course Curriculum

Developed for

Hughes EDD

Workplace Learning Resource Center

A service of El Camino College

MATH CLASS OUTLINE - Hughes EDD

(All Sessions are 90 Minutes in Duration)

INSTRUCTOR: Roberto Pandolfi

Session	Topic	
1.		a. Math Skills Assessment Overview b. The Introduction to a Calculator (a calculator will be given to each student) c. Administer Skill Assessment No. 1 - (Basic Arithmetic)
2.	Basic Arithmetic	Basic Arithmetic Operations of Addition and Subtraction of Whole and Decimal Numbers. Basic Arithmetic Operations of Multiplication and Division of Whole and Decimal Numbers.
3.	Basic Arithmetic	Basic Operational order of Addition/Subtraction/Multiplication and Division of Whole and Decimal Numbers. Rounding Whole and Decimal Numbers.
4.	Basic Arithmetic	Session No. 3 continued.
5.	Fractions	Introduction to Prime and Composite Numbers; Prime Fractionation; Application of Fractions. Skill Assessment No. 2 - (Basic Arithmetic Operations)
	Fractions	Proper and Improper Fractions; Mixed Numbers, Addition and Substraction.
6.	Fractions	Addition and Subtraction of Proper and Improper Fractions and Mixed Numbers continued.
	Fractions	Addition and Subtraction of Proper and Improper Fractions and Mixed Numbers continued. Skill Assessment No. 3 - (Addition/Substraction of Proper and Improper Fractions and Mixed Numbers)
7.	Fractions	Multiplication of Proper and Improper Fractions and Mixed Numbers.

8.	Fractions	Multiplication of Proper and Improper Fractions and Mixed Numbers continued.
		Skill Assessment No. 4 - (Multiplication of Fractions)
9.	Fractions	Division of Proper and Improper Fractions and Mixed Numbers.
10.	Fractions	Division of Proper and Improper Fractions and Mixed Numbers continued.
		Skill Assessment No. 5 - (Division of Fractions)
	Fractions	Fractions and Whole Numbers
11.	Fractions	Operational order of Addition, Subtraction, Division and Multiplication of Fractions.
12.	Fractions	Operational order of Addition, Subtraction, Division and Multiplication of Fractions continued.
		Skill Assessment No. 6 - (Operational order of Fractions)
13.	Conversions	Conversions between Fractions to Decimals and Decimals to Fractions.
14.	Conversions	Conversions between Fractions to Decimals and Decimals to Fractions continued.
		Skill Assessment No. 7 - (Conversions between fractions/Decimals and Decimals/Fractions)
15.	Percents	Percent and Percent Calculations.
16.	Percents	Percent and Percent Calculations continued.
17.	Percents	Percent and Percent Calculations continued.
18.	Percents	Percent and Percent Calculations continued.
		Skill Assessment No. 8 - (Percent and Percent Calculations)
19.		Final Assessment
		Skill Assessment No. 9 - (Final)

Technical Math Using Blueprints Course A

Workplace Learning
Resource Center

A service of El Camino College

BLUEPRINT READING USING APPLIED MATH - COURSE A
8 Week Class - 1 Hours a Week

WEEK 1

Part one

1. Introduction
2. Administer pretest

Part two

1. Orthographic projection
2. Different types of blueprints
3. Different types of lines
    1. Visible
    2. Centered
    3. Dashed

WEEK 2

Part one

1. Orthographic projection - continued
2. Freehand sketching
3. Pictorial drawings - introduction
4. Scale - introduction
5. Fractions - applied math

Part two

1. Scale: engineer
2. Orthographic projections - continued
3. Fractions, decimals - applied math
4. Convert fractions to decimals

WEEK 3

Part one

1. Fractions, decimals - continued
2. Basic dimensions

Part two

1. Decimals - applied math
2. Conversion problems
3. Shop floor math problems

WEEK 4

Part one

1. Decimals - continued
2. Dimensions - continued
3. Sections - introduction
4. Review blueprints from *Hughes*

Part two

1. Sections

WEEK 5

Part one

1. Assessment
2. Fasteners - introduction
3 Review blueprints from *Hughes*

Part two

1. Review sections
2. Review scale

WEEK 6

Part one

1. Review sections
2. Review test
3. Title block - introduction
4. Review fasteners

Part two

1. Title block - continued
2. Auxiliary views - introduction
3. Geometric tolerancing

WEEK 7

Part one

1. Geometric tolerancing - continued
2. Percentages - applied math
3. Detail & assembly drawing - introduction
4 Review blueprints from *Hughes*

Part two

1. Rain deer project
2. Percentages - continued
3. Detail drawings
4. Assembly drawings

WEEK 8

Part one

1. Ratios - applied math
2. assembly drawings - continued

Part two

1. Final course assessment

Technical Math Using Blueprints Course B

Workplace Learning
Resource Center

A service of El Camino College

BLUEPRINT READING USING APPLIED MATH - COURSE B
6 Week Class - 3 Hours a Week

WEEK 1

Part one

1. Introduction
2. Administer pretest
3. Scale: full, half, etc.
4. Orthographic projection - sketching
   - A. Importance of obtaining a mental image of an object from a print
   - B. Recognize the viewing angles for front, top and side
   - C. Discuss how the drafter selects views
   - D. Explain the relationships among surfaces, lines, and points
   - E. Steps involved in visualizing an object

Part two

1. Orthographic projection continued
2. Math: fractions and decimals
   - A. Relate fractions to parts of an inch
   - B. Fractions to decimals
3. Pictorial sketching
   - A. How pictorial sketching can help in the visualization of an object
   - B. Common types of pictorials
   - C. Sketching of circles

WEEK 2

Part one

1. Auxiliary views
   - A. Discuss why auxiliary views are selected
   - B. Discuss why partial auxiliary views are used
   - C. Different types of auxiliary views
2. Measuring tools
   Micrometer, caliper, etc.

Part two

1. Auxiliary views continued
2. Math: fractions, decimals
3. Review simple blueprints from text and *Hughes*

WEEK 3

Part one

1. Sections
   - A. Purpose of sections
   - B. Importance of the cutting plane and location
   - C. Explain different types of sections
   - D. Describe material representation on section views

Part two

1. Exam (Assessment)

WEEK 4

Part one

1. Review test
2. Title block
   - A. Purpose of title block
   - B. Material block
   - C. Revision or change block
   - D. Zone
3. Review blueprints from *Hughes*

Part two

1. Materials of the trade
   - A. Factors involved in selection of materials
   - B. Basic types of materials used in industry
   - C. Different types of steels, non-ferrous metals, plastics
   - D. Material treatments
   - E. Material terms: alloy, deburring, temper
2. Review blueprints from *Hughes*

WEEK 5

Part one

1. Machine specifications
   - A. Thread representation and specifications
   - B. Thread notations
   - C. Different types of threaded fasteners
   - D. Different types of nonthreaded fasteners
2. Review blueprints from *Hughes*

Part two

1. Tolerances
   - A. Why geometric dimensioning is needed
   - B. Benefits of using symbols
   - C. Common geometric dimensioning terms
   - D. Basic rules of geometric dimensioning
   - E. How feature control symbols are displayed
2. Review blueprints from *Hughes*

WEEK 6

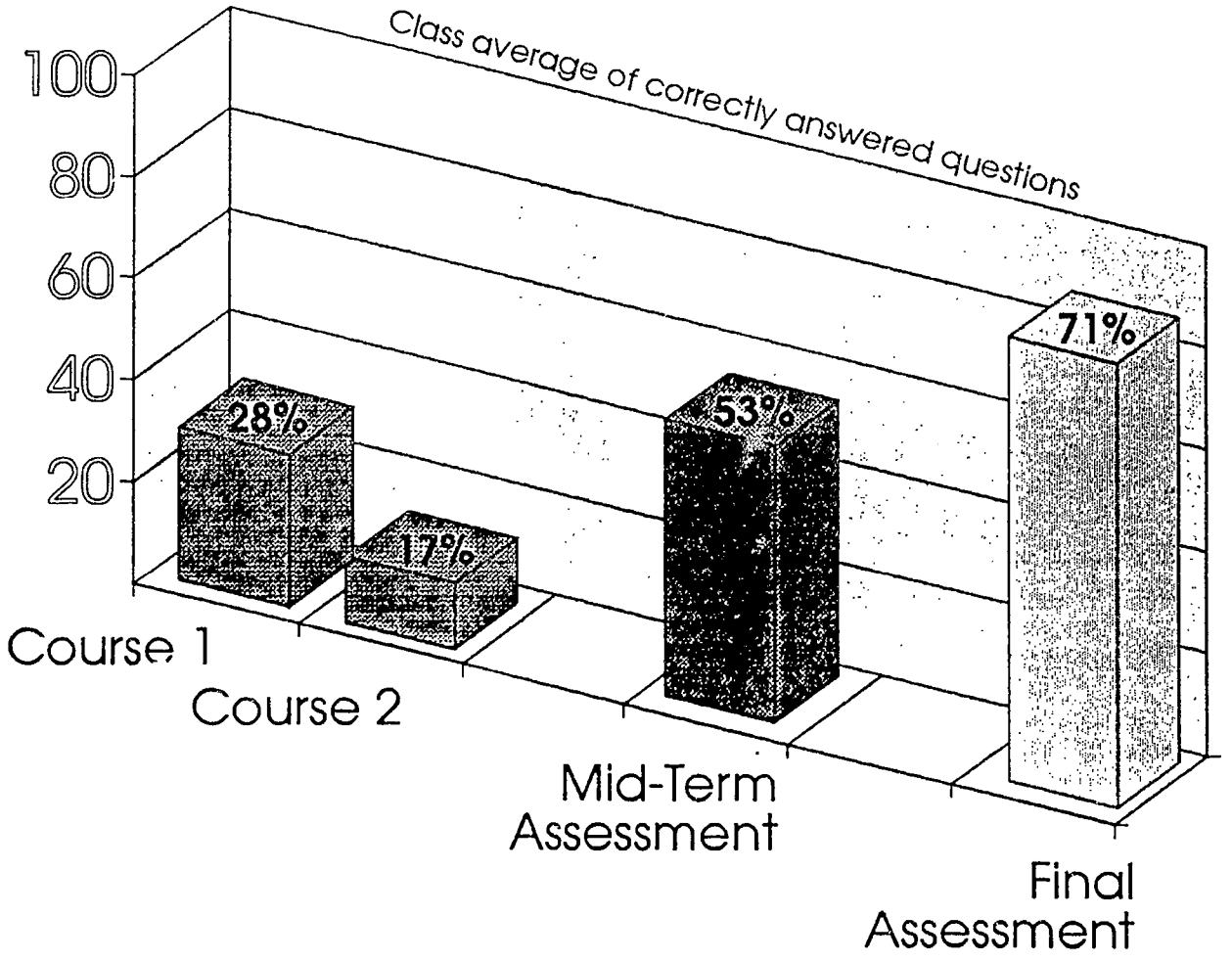
Part one

1. Review for final
2. Review blueprints from *Hughes*

Part two

1. Final exam (assessment)

Hughes EDD Blueprint Reading Courses 1 and 2 Progress Assessment Scores



Class average scores compiled 1/1/94

Technical Math Using Blueprints Instructional Assessment

Workplace Learning
Resource Center

A service of El Camino College

NAME:_____
DATE:_____

MATCHING: MATCH THE PROPER TERM WITH THE DEFINITION BELOW.

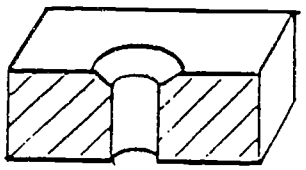
A. CHAMFER
B. BOSS
C. COUNTERSINK
D. COUNTERBORE
E. SPOTFACE
F. RELIEF
G. ALLOWANCE
H. BOLT CIRCLE
I. BUSHING
J. FILLET

1._____A REPLACEABLE LINING OR SLEEVE FOR A BEARING.

2._____MINIMUM CLEARANCE BETWEEN MATING PARTS.

3._____AN OFFSET OF SURFACES TO PROVIDE CLEARANCE FOR MACHINING.

4._____



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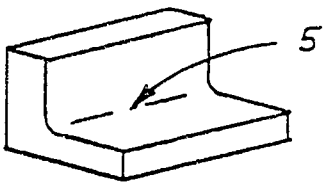

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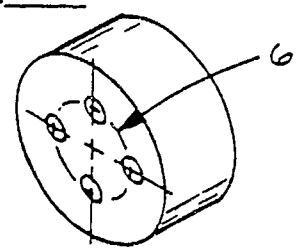

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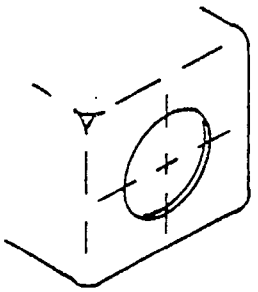

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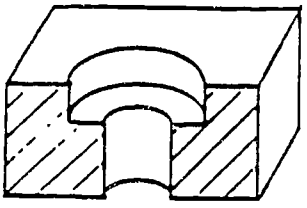

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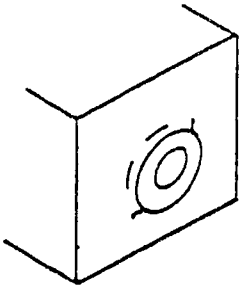

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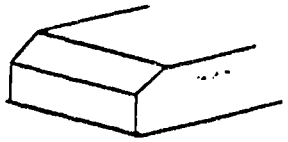
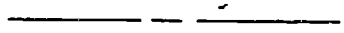


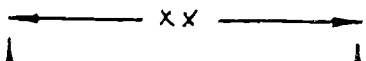
IDENTIFY THE LINES BELOW:

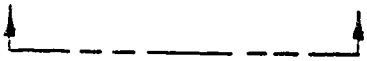
A.

B.

C. 

D. 

E. 

F. 

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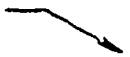
J. 

K.

1. ____ DIMENSION LINE

2. ____ SHORT- BREAK LINE

3. ____ PHANTOM LINE

4. ____ VISIBLE OR OBJECT LINE

5. ____ SECTION LINE

6. ____ CENTER LINE

7. ____ LONG- BREAK LINE

8. ____ LEADER LINE

9. ____ CUTTING PLANE OR VIEWING PLANE LINE

10. ____ HIDDEN LINE

11. ____ ARROWHEAD

DESCRIBE THE THREAD CALLOUT BELOW BY WRITING A WORD / WORDS IN THE SPACES BELOW.

.250 - 20 UNC - 2B

1. _____

2. _____

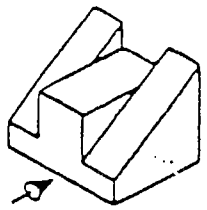
3. _____

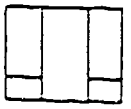
4. _____

5. _____

SELECT THE CORRECT VIEW INDICATED BY THE ARROW IN THE PICTORIAL DRAWING.
PLACE THE IDENTIFYING LETTER IN THE ANSWER SPACE AT THE RIGHT.

1



A 
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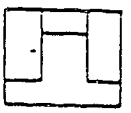
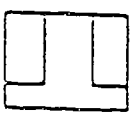
C 
D 

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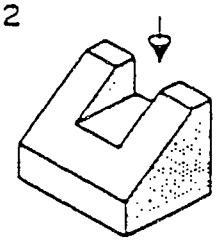
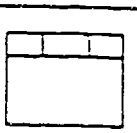
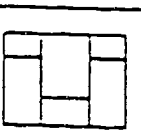
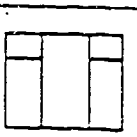
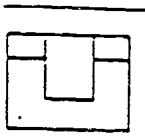


A 
B 
C 
D 

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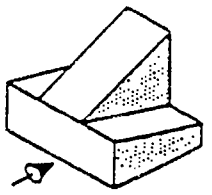
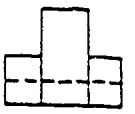
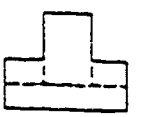
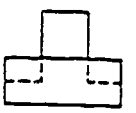
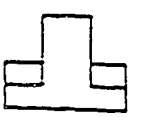


A 
B 
C 
D 

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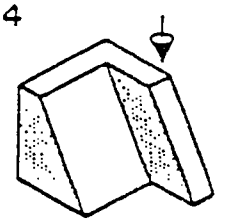
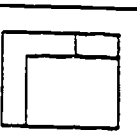
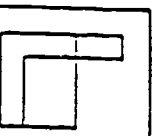
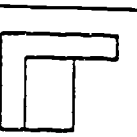
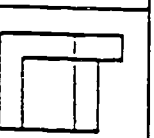


A 
B 
C 
D 

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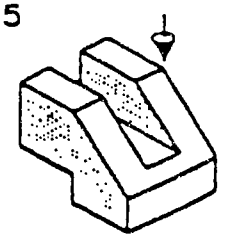
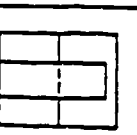
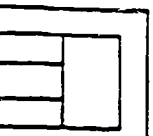
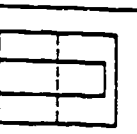
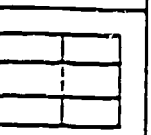


A 
B 
C 
D 

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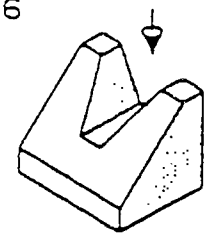
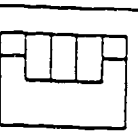
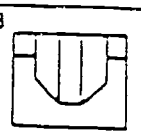
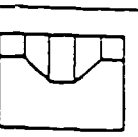
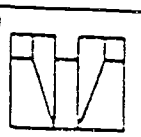


A 
B 
C 
D 

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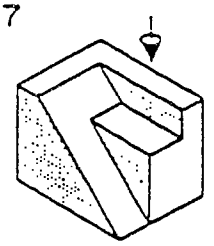
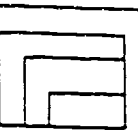
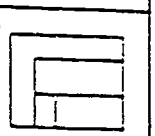
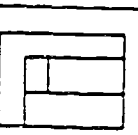
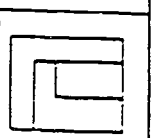


A 
B 
C 
D 

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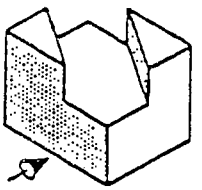
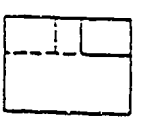
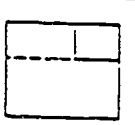
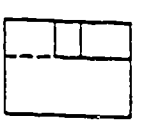
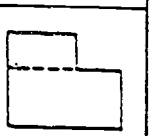


A 
B 
C 
D 

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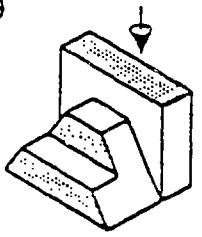
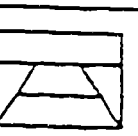
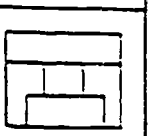
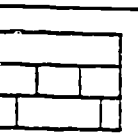
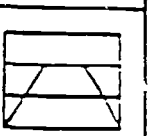


A 
B 
C 
D 

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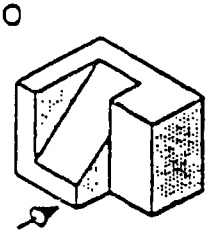
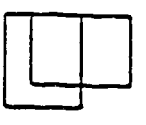
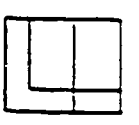
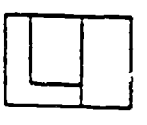
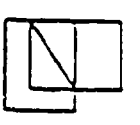


A 
B 
C 
D 

1 ____
2 ____
3 ____
4 ____
5 ____
6 ____
7 ____
8 ____
9 ____
10 ____

Name:_____
Date:_____

FRACTIONS

1. Convert to a mixed number: 77/3

2. Convert to an improper fraction: 11 1/9

3a. Add (reduce to lowest terms) 3/7 + 1/21 =
3b. Add (reduce to lowest terms) 4/7 + 13/14 =

4. Subtract (reduce to lowest terms) 14 1/4 - 3 3/4 =

5. Multiply (cancel as needed) 6 1/5 x 3 2/11 =

6. Divide (cancel as needed) 12/18 ÷ 6 1/4 =

DECIMALS

7. Convert to proper fractions or mixed numbers (do not reduce to lowest terms)

   a. .621 b. 6.31 c. .9

8. Convert fractions to decimals (or mixed decimals) and round to nearest hundredth

   a. 3/7 b. 2/5 c. 12 1/9

9. Subtract: 12.19432 - 10.005 =

10. Divide: 182,185 ÷ 3.24 =

VOCABULARY MATCHING: (optional)

_____12. Cancellation	A. Largest possible number.
_____13. Denominator	B. No number except one divides evenly into numerator and denominator.
_____14. Fraction	C. Expresses a part of a whole number.
_____15. Greatest common divisor	D. Whole number and a proper fraction.
_____16. Higher terms	E. Top of fraction
_____17. Improper fraction	F. Equivalent to the original.
_____18. Least common denominator (LCD)	G. Numerator less then denominator
_____19. Lowest terms	H. Reducing process.
_____20. Mixed numbers	I. Interchanging denominator and numerator.
_____21. Numerator	J. Smallest whole number.
_____22. Prime numbers	K. Numerator is equal to or greater than the denominator.
_____23. Proper fractions	L. Number divisible by itself and one.
_____24. Reciprocal	M. Bottom part of fraction.

REVISED	A
REFER.	

DRAWN	TRACED	THE TRANE CO., LA CROSSE, WIS.	
JCR		SEAL COVER	C-4331 3213
SCALE 12 = 12"	O. K. DATE 3-31-	MODEL F COMP.	

PART NO	NO REQ	NAME	STOCK SIZE OR PATT NO	MAT'L	DRG NO	CODE
1	1	COVER	PATT. NO 3114-1	CI		

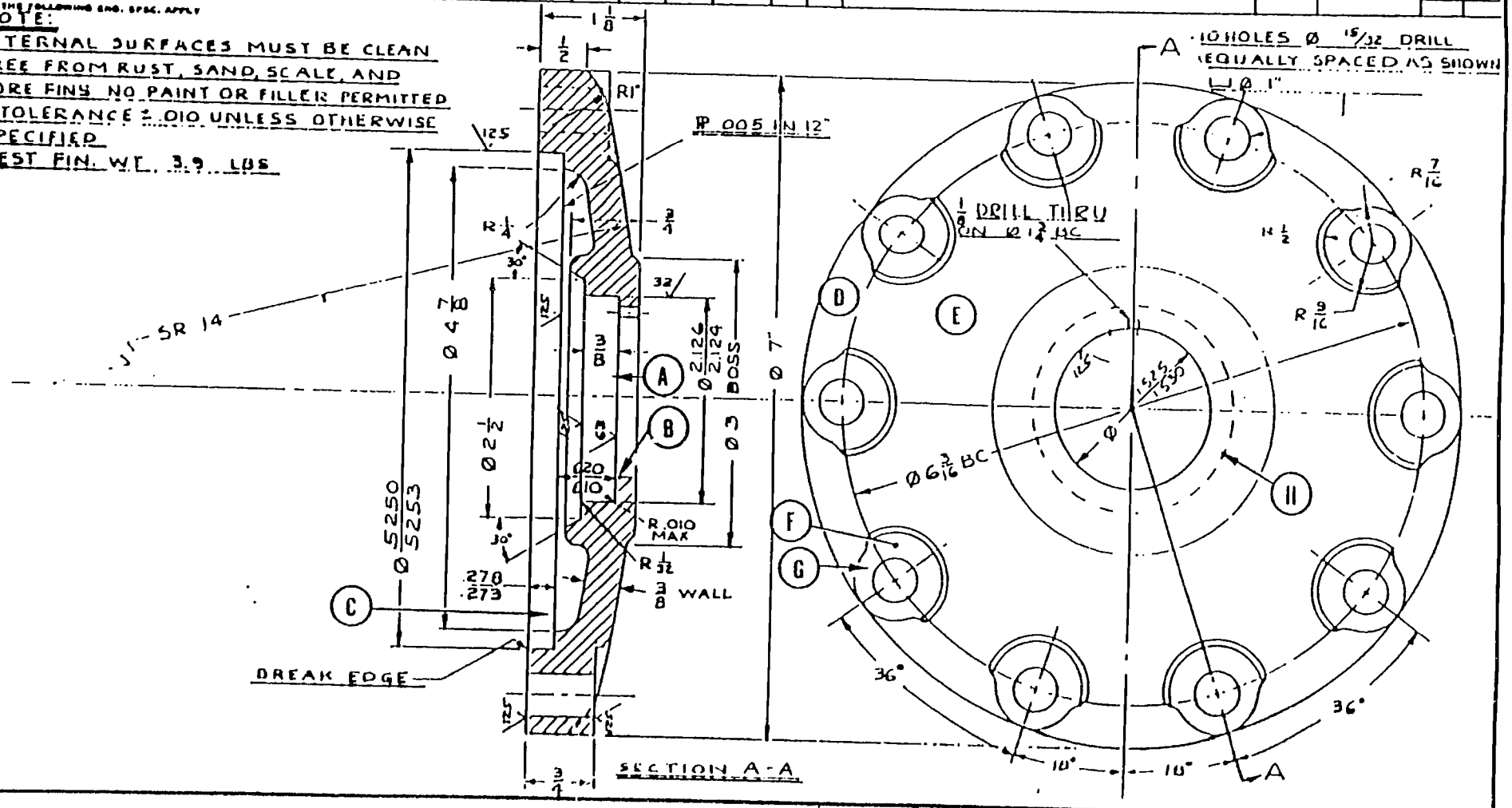
THE FOLLOWING END. SPEC. APPLY

NOTE:

INTERNAL SURFACES MUST BE CLEAN FREE FROM RUST, SAND, SCALE, AND CORE FINS NO PAINT OR FILLER PERMITTED

2. TOLERANCE ± .010 UNLESS OTHERWISE SPECIFIED

3 EST FIN. WT. 3.9 LBS



41

42

BLUEPRINT READING

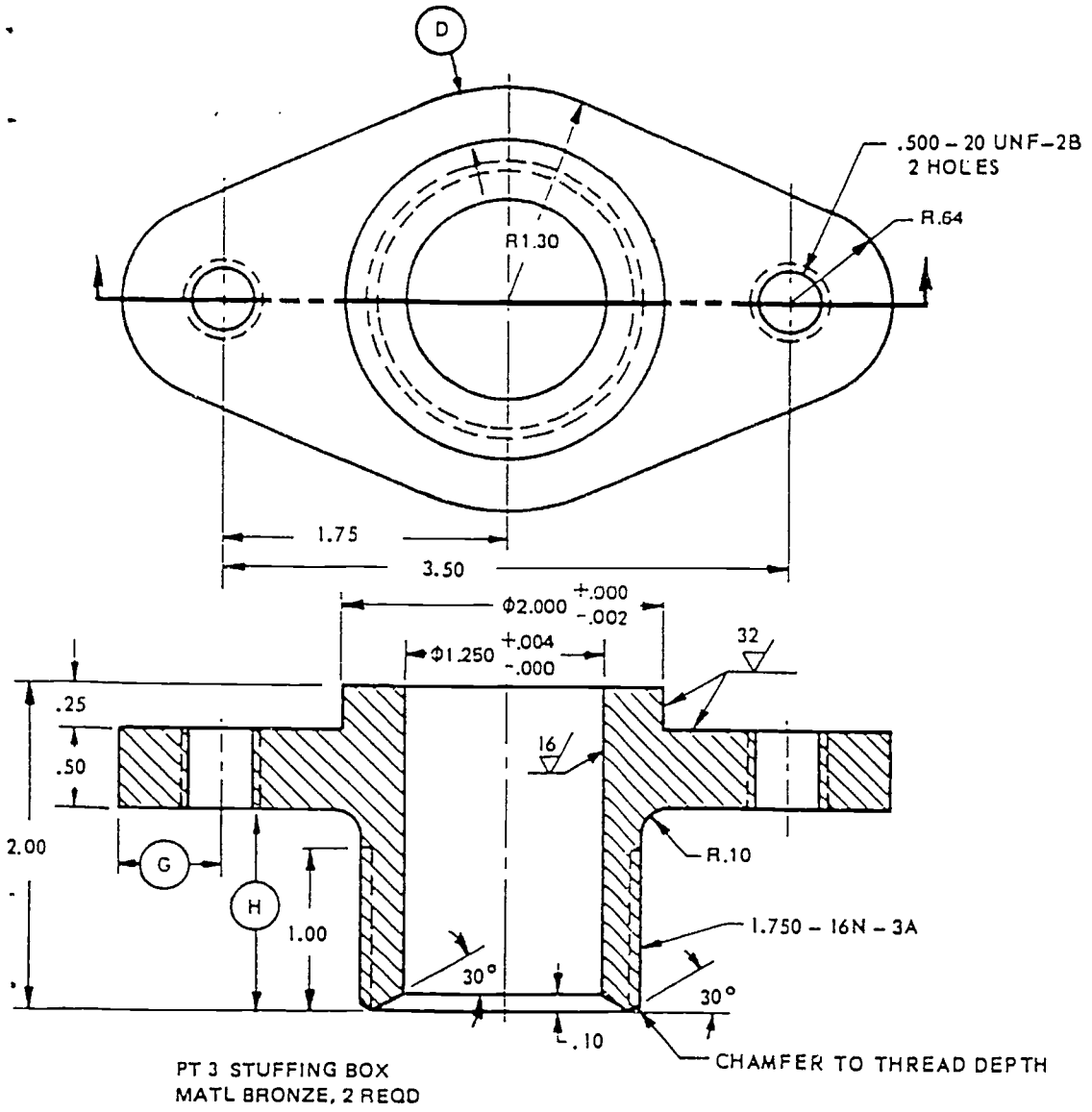
Refer to the blueprint and answer the following questions.

1. What is the name of the part? 1. _____
2. What is the number of the print? 2. _____
3. What is the scale of the original plan? 3. _____
4. What is the material specification? 4. _____
5. List the surface texture required at A? B? 5. A _____
   B _____
6. Give the diameter of B. 6. _____
7. What surface texture is called out at C? F? 7. C _____
   F _____
8. What is the machine process specification called for at G and at G and at F? 8. G _____
   _____
   F _____
9. Give the thickness of the casting at G after the spotfacing operation? 9. _____
10. What dimensions are given for surfaces D and E? 10. D _____
    E _____
11. Give the diameter of the invisible surface H. 11. _____
12. What treatment is to be given internal surfaces? 12. _____
    _____
    _____

Technical Math Using Blueprints Final Assessment

Workplace Learning
Resource Center

A service of El Camino College



PT 3 STUFFING BOX
MATL BRONZE, 2 REQD

NOTE: EXCEPT WHERE NOTED –

TOLERANCE ON TWO-PLACE DIMENSIONS ± .02

TOLERANCE ON THREE-PLACE DIMENSIONS ± .005

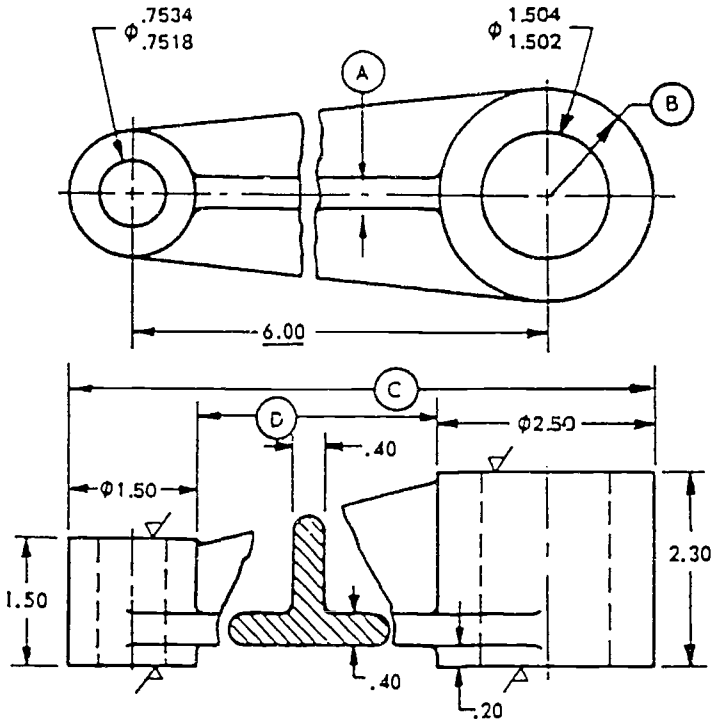
TOLERANCE ON ANGLES ± 0.5°

32 EXCEPT WHERE NOTED

1. What kind of section is used on this drawing ?_____
2. What is the maximum width of the part ?_____
3. What size thread is cut on the outside of the part ?_____
4. What is the tolerance on the center-to-center distance between the tapped holes ?_____
5. What is the smallest diameter to which the hole through the stuffing box can be made ?_____
6. What is the largest diameter to which the hole through the stuffing box can be made ?_____
7. What are the limits for the 2.000 DIA. dimension ?_____
8. What is the finish of the hole through the stuffing box ?_____
9. What size threads are cut on the inside two holes of the part ?_____
10. What material is the part made of ?_____
11. Calculate the distances: D _____

G _____

H _____



SHAFT SUPPORT
MATL – MI

EXCEPT WHERE STATED OTHERWISE:
TOLERANCES ON
TWO-DECIMAL DIMENSIONS ± .02
THREE-DECIMAL DIMENSIONS ± .005
ROUNDS AND FILLETS R.10
MACHINE FINISH 32

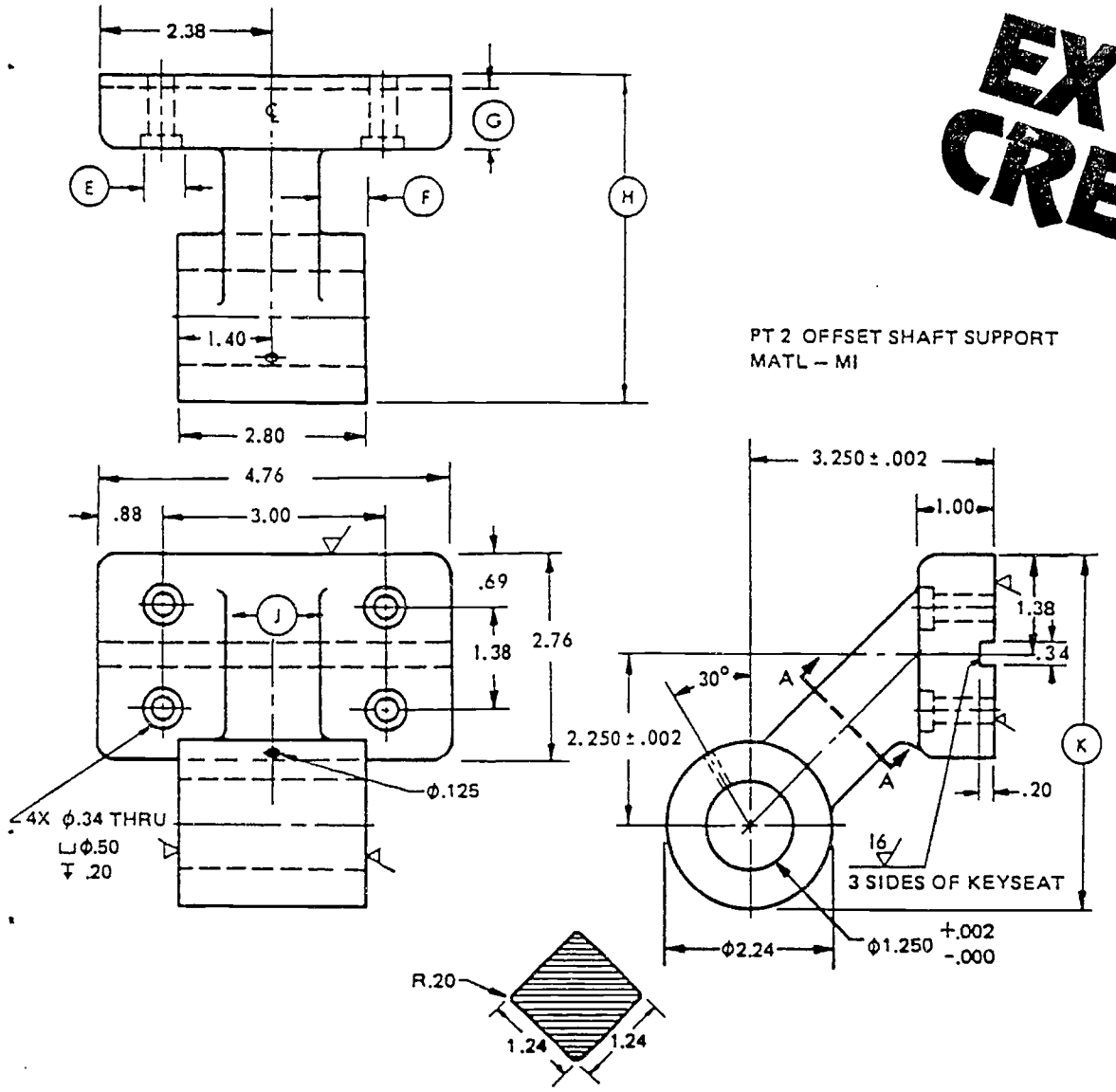
1. What kind of section is used on the front view of this drawing? _____
2. How many surfaces require finishing? _____
3. Which surface finish is required? _____
4. What is the maximum center-to-center distance between holes? _____
5. What is the maximum possible diameter of the large hole? _____
6. What is the minimum possible diameter of the large hole? _____.
7. Calculate the distances: A _____

B _____

C _____

D _____

EXTRA CREDIT



PT 2 OFFSET SHAFT SUPPORT
MATL – MI

SECTION A-A

1. What kind of section is used on this drawing? _____
2. How many surfaces require finishing? _____
3. What is the finish of the keyseat? _____
4. What is the depth of the counterbored holes? _____
5. What is the maximum possible diameter of the large hole? _____
6. What is the minimum possible diameter of the large hole? _____
7. Calculate the distances: E _____

   F _____

   G _____

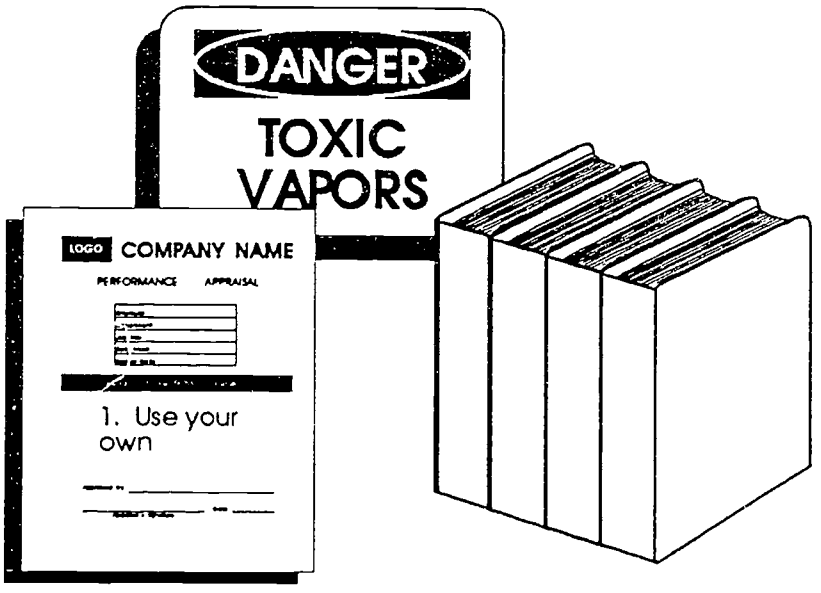
   H _____

   K _____

ESL/Reading Course Curriculum

Developed for

Hughes EDD



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HUGHES EDD
ESL Reading Class
Course Curriculum

Course Objective

This reading course is designed to assist the hourly employees of Hughes EDD whose native language is not English to understand the various forms of written communication that they encounter on the job. The reading skills are contextualized within the business format and most of the curriculum is derived from actual work documents. Simultaneously, because of the passages selected to be read, the employees are learning more about Total Quality Management, one of the main focuses of the Hughes EDD Corporation this year. A secondary objective of this course is the improve the employees' quality of life outside of the workplace through their enhanced ability to read.

Course Overview

All reading skills are taught within the context of the workplace. Topics that are read include TQM, continuous measurable improvement (brainstorming, checklists/checksheets, tables, graphs and charts), customer service, problem solving, necessary employee skills, and safety. Most of these topics are introduced through Hughes-specific work documents such as their mission statement, the various newsletters, actual memos and materials that had flowcharts, checksheets, histograms, pareto charts, etc.

Specific skill areas include the development of vocabulary skills, where students are taught to recognize and identify unfamiliar words through looking up the definition, finding meaning clues from the context, and looking at the word parts and the development of reading skills where students are taught to read with a purpose (look for main ideas, details, and inferences), self-question, predict, classify, skim and scan.

Course Schedule

1. Setting the Tone
   - A. Introductions
   - B. Explain course objections
   - C. Develop classroom attitude of teamwork and motivation
   - D. Assess Students (pre-test)

2. Improving Reading through Pre-reading
   - A. Learn new vocabulary words through definition
   - B. Introduce pre-reading concepts (relating new information to previous knowledge, looking for format clues, self-questioning

3. Reading for a Purpose-the Customer
   - A. Identify vocabulary meaning from the context
   - B. Understand "customer" - internal/external
   - C. Understand purpose of reading
   - D. Give brief introduction on flow charts

4. Reading for a Purpose-Employee skills
   - A. Continue learning vocabulary meaning from the context
   - B. Identify important employee skills
   - C. Look for the main idea (purpose) in reading
   - D. Understanding and designing a flow chart

5. Problem-solving and Reading
   - A. Reinforce concept of learning word meaning from the context
   - B. Define relationship between problem-solving and reading
   - C. Look for main idea and details (purpose)
   - D. Summarize flow charts

6. Reading Memos
   - A. Continue recognizing and defining unknown vocabulary
   - B. Identify subject and details in memos
   - C. Learn test-taking strategies through analyzing previous week's quiz
   - D. Learn data collection techniques via checklists/checksheets

7. Reading about Safety, Hazardous Waste and Reading Charts
   - A. Continue identifying and defining words from context
   - B. Continue looking at main ideas and details
   - C. Identify and understand tables, pie charts, bar charts, and line charts

8. More Charts and Hughes-Specific Vocabulary
   - A. Learn Hughes-specific vocabulary list
   - B. Learn multiple choice test-taking strategies
   - C. Continue working with pie/bar/line charts

9. Mid-course Evaluation
   - A. Test proficiency level of employees and do demographic survey
   - B. Allow students to rate class and give comments

10. Restating Information Learned through Reading
    - A. Continue learning vocabulary-list generated from students themselves
    - B. Learn to restate or summarize information
    - C. Introduce Pareto Charts

11. Diamond Signs and Pareto Charts
    - A. Continue learning class-generated vocabulary
    - B. Learn meaning of diamond sign symbols
    - C. Continue summarizing/restating
    - D. Understand pareto charts in more detail

12. Classifying Information Learned
    - A. Review vocabulary
    - B. Learn to classify information
    - C. Design a pareto chart for the purpose of understanding one

13. Reading about Communication Skills
    - A. Learn vocabulary meaning through looking at word parts
    - B. Learn qualities that employers look for in applicants
    - C. Continue to summarize and classify information
    - D. Complete pareto chart

14. Improving Reading through Predicting
    - A. Learn more word parts
    - B. Learn to predict what comes next while reading
    - C. Introduce Basic Fishbone (Cause and Effect Analysis) Chart

15. Skimming/Scanning
    - A. Learn more word parts
    - B. Learn to skim/scan for specific information
    - C. Continue learning about the Basic Fishbone

16. Reading Company Newsletters
    - A. Review Vocabulary
    - B. Practice skimming/scanning
    - C. Do brainstorming/Reverse Fishbone

17. Final Check
    Test mastery level

18. Wrapping It Up
    - A. Summarize important concepts from the class
    - B. Give the students the results of the testing
    - C. Evaluate the class

BP CHEMICALS (HITCO)
Written Business Communication Course Curriculum

Workplace Learning
Resource Center
A Service of El Camino College

BP CHEMICALS (HITCO)
Written Business Communications
Course Curriculum

Course Objective

Curriculum was specifically designed as an application-oriented, "how-to", written business communication course intended to improve the basic communication skills of the hourly employees at BP Chemicals (HITCO). This course includes three different versions, to satisfy different skill levels and requirements, of basic written communication instruction. Each of these courses are specifically designed for each BP Chemical (HITCO) working group.

Course Outline

Each attendee, after receiving information and performance-directed lectures, practical demonstrations, homework and in-classroom assignments, should be able to:

- Understand the importance of effective communication in an organization - realizing the potential of financial loss due to poor communication.
- Explain the human relation aspect of communication.
- Write clearly and effectively, employing principles of good sentences and structure.
- Identify and employ the proper psychological approach to be used for various communication situations.
- Develop logical patterns of presenting ideas as a means of achieving clear, concise expression.
- Use listening skills as a tool for writing effective documents.

Course Schedule

1. **Introduction to Business Communications**
   - A. Role of Communication in Business
   - B. Fundamentals of Business Writing

2. **Basic Writing Skills**
   - A. Construction of Clear Sentences and Paragraphs
   - B. Short Sentences
   - C. Care in Paragraph Design

3. **Intermediate Writing Skills**
   - A. Writing Monthly Reports
   - B. Interoffice Correspondence
   - C. Writing Rules and Regulations
   - D. Simple Business Reports

4. **Intermediate Writing Skills - Continued**
   - A. Writing the BP Chemicals *Business and Status Report*
   - B. Writing Reports with Topical Matter
   - C. Writing Performance Appraisals
   - D. Writing Team Reports

5. **Complex Business Correspondence**
   - A. The Sales Letter
   - B. Supplementary Sales Letters
   - C. Letters to Regain Lost Buyers

BP CHEMICALS (HITCO)
Written Business Communication
Detailed Course Curriculum

Week One

The role of communications in business is discussed in the first week. Topics include the importance of communications skills to the attendees, why businesses need to communicate, main forms of communications in business, and the communications network of an organization. Next, the fundamentals of business writing are covered. Topics include suggestions for selecting appropriate words, writing an effective sentence, getting to the point and concise architecture.

Week Two

Week Two covers the construction of clear sentences and paragraphs. Emphasis is given on short, concise sentences and limiting sentence content. Economizing on words, determining emphasis in sentence design, giving the sentence unity and arranging sentences for clarity are all reviewed. The second half of Week Two covers paragraph design. Attendees will learn how to give a paragraph unity, keep paragraphs short, make good use of topic sentences, leave out unnecessary details, and give paragraphs movement.

Week Three

Week Three is designed to give an introduction to simple business communications and begins the opportunity for the attendees to use the skills gained in the first two weeks. Attendees learn how to write simple, summary monthly reports and basic interoffice memos. The steps necessary to write rules and regulations are also covered. Finally, very simple business reports are covered as an introduction to the more challenging skills offered in Weeks Four and Five.

Week Four

Week Four is an introduction to BP Chemicals-specific correspondence. Writing *BP Chemicals' Business and Status Report* is the major emphasis of this week. Attendees will also become familiar with writing reports with topical matter and understanding and writing performance appraisals.

Week Five

Week Five integrates the ideas covered in the last four weeks. Attendees will learn to use the skills they have learned to write persuasively and confidently. Sales and purchasing correspondence were chosen as challenging business communications that require both technical and visionary writing skills. Understanding sentence structure (covered in Weeks One and Two), putting the information into correct context and format (Weeks Three and Four), and giving the letter an individual yet professional personality are covered in the format of sales letters. The week ends with an informal question and answer period pertaining to business correspondence in general.

BP CHEMICALS (HITCO) Team-Based Organization Leadership Skills Course

Workplace Learning Resource Center
A Service of El Camino College

BP CHEMICALS (HITCO)
Team-Based Organization Leadership Skills Course
Course Curriculum

Course Objective

The intention of this course on leadership in a team-based organization is to help BP Chemicals' *Leads* understand the important aspects of teams and leaders within the BP Chemicals work environment and is in full support of BP Chemicals' Business Plan. *Leads* are defined as hourly employees with process operations responsibilities. Courses will include *measurable results.* Each hour of instruction will *utilize some form of assessment that encapsulates that period of instruction.*

Course Outline

This course is designed to give an understanding of the dynamics of leading a team. The beginning of the course focuses on defining and understanding a team-based workforce. Important team concepts will be discussed, including the benefits of working in a team environment and understanding underlying team influences. Once an understanding of the concept of a team has been established, the course will focus on the leader of a team - the qualities, skills and behaviors that contribute to the shaping of a good leader. The third portion of the course focuses on a forgotten subject in most leadership studies - the follower. Understanding followers as distinct individuals and being able to respond to their individual needs will be discussed. The fourth portion of the course discusses the team environment; stress, managing conflict and encouraging team creativity will be discussed. Finally, the course is summarized so as to facilitate integration of the topics and to encourage the development of personal leadership skills.

Course Schedule

1. **Introduction To Teams**
   - a. What is a team?
   - b. What are the advantages of teams?
     1. employee empowerment
     2. flexibility
     3. increased productivity
     4. improved quality
   - c. Create assessment that encapsulates the instruction
   - d. *Define a "Lead" (section, department, process leader)*
   - e. *Identify "What Skills I Need" to be a more effective/efficient team member and department of process leader.*
   - f. *Define teams (responsibilities, process, interaction, dependencies, etc.*

2. **Team Dynamics**
   a. Group size
   b. Developmental stages of a group - forming, storming, norming, performing
   c. Group roles - relationship role, role conflict, role ambiguity
   d. Group norms
   e. Group communications network
   f. Group cohesion
   g. *The importance of effective and meaningful communication.*
   h. *Emphasis "Believing In What We Are Doing"*
   i. *Target most difficult problem for project objective*
   j. *Time management*

3. **The Leader**
   a. Leadership is not a position
   b. No simple recipe for effective leadership
   c. Intelligence, Personality and leadership
   d. Values and attitudes of a leader
   e. *Leadership skills*
   f. *Assess skills to be a leader*
   g. *Achieving day-to-day success*

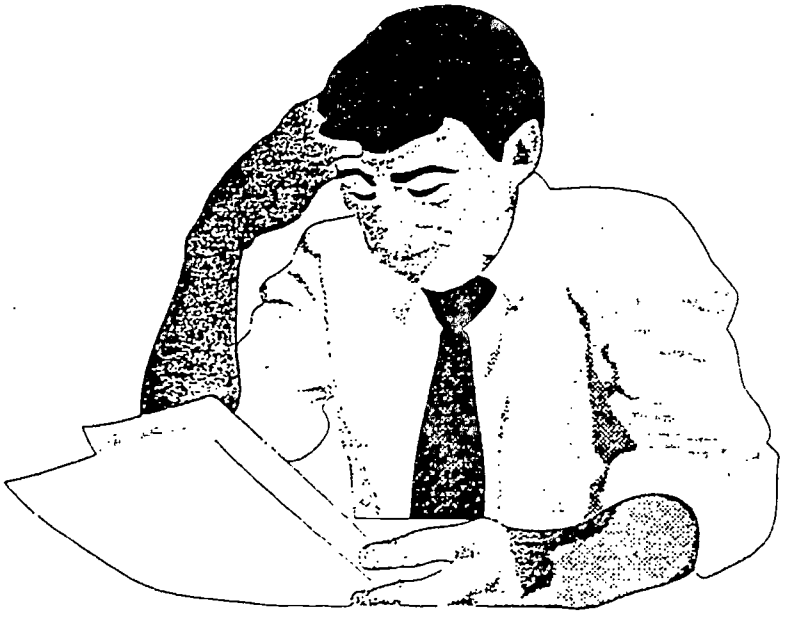
4. **The Followers**
   a. Followers as important individuals
   b. Follower behavior
      1. sheep
      2. yes people
      3. survivors
      4. alienated followers
      5. effective followers
   c. Follower characteristics
      internal and external locus of control
   d. *Achieving day-to-day success*

5. **The Team Environment - Characteristics**
   a. Individual morale building
   b. Task characteristics
   c. Organizational characteristics
   d. Environmental characteristics

6. **The Team Environment - Leader Responsibilities**
   a. Encourage creativity
   b. Managing conflict and negotiating
   c. Managing stress
   d. Diagnosing performance problems

7. **Putting It Together**
   a. The team
   b. The leader
   c. The followers
   d. Developing a personal leadership style
   e. Creating an effective team
   f. *Time management*

BP CHEMICALS (HITCO)
Study Skills
Proposed Course Curriculum



Workplace Learning
Resource Center
A Service of El Camino College

BP CHEMICALS (HITCO)
Study Skills
Course Curriculum

Course Objective

The intention of this course on study skills is to help hourly workers plan how to efficiently complete an assignment within a reasonable amount of time without having to give up their personal time. This course will teach employees ways to organize themselves and the materials they are working with or studying and prepare themselves to take tests. As they learn these skills, their work should become easier and more productive. Each hour of instruction will utilize some form of assessment that encapsulates that period of instruction.

Course Outline

This course is designed to help employees manage their work time, personal time, and be able to confidently take tests by improving their study skills. The first week of the course defines 'how to study' and organization as important steps in the process of improving study habits. A study habits checklist will be distributed and establishing priorities will be discussed. The second work focuses on the study environment and how to improve studying time quality. Studying in a quiet place, using a desk or table, and resisting distractions and interruptions will be covered. Attendees will be shown how to design their own personal weekly schedule and how to plan the use of study time. The third week consists of the most important part of the study skills curriculum - active thinking. Students are taught to think about what they are reading or hearing, look for the main ideas, and review what they have heard/read so that they will remember important information. Week four covers note taking and test taking and helps students identify the main idea and important details of verbal instructions and written communications to more effectively take tests. Finally, the last week integrates the study skills learned in the previous four weeks and helps identify the relation between more efficient and easier work and better study skills.

Course Schedule

1. **Introduction/Evaluate Yourself**
   - A. Introduction
   - B. Evaluate Yourself
     1. Present Study Habits
     2. Priorities
     3. Goals
     4. *Relate Evaluation to BP Chemicals Job Position and what skills are necessary to be more effective and efficient.*

C. Organization
   1. Study Materials
   2. Assignments
   3. How To Remember Information
   4. *What Particular Organization skills are needed in a BP Chemicals Job Position*

2. Preparing To Study
A. How to Evaluate Study Environment
B. How To Improve Quality of Studying
C. Scheduling Time
   1. How To Design A Personal Weekly Schedule
   2. Plan The Use Of Your Time

3. Actively Thinking
A. How to Understand What You Have Read or Heard
B. How to Remember What You Have Read or heard
C. *Achieving day-to-day success*

4. Note Taking and Test taking
A. Note Taking
B. Test Taking
   1. Three Basic Test Preparation Steps
   2. Four Basic Steps For Reducing Test Anxiety

5. Integration Of Ideas and Concepts
A. Active Thinking Practice
B. Note Taking Practice
C. BP Chemicals Job Position Applications For Improved Study Skills

BP CHEMICALS (HITCO)
Study Skills
Detailed Course Curriculum

Week One

Week one begins with an introduction of the topics to be covered. Attendees will be given a study habits evaluation form to introduce them to how they view studying. Establishing priorities and goals will be discussed and several priority-ranking experiments will be completed. Goal organizers will be completed and discussed. After understanding goals and priorities, the importance of being organized will be covered. Checklists, assignment sheets, and steps to improve memory are covered.

Week Two

Choosing the right environment in which to study is extremely important. Finding a quiet place, free of interruptions and distractions, and comfortable to the studier are all important considerations. Once a quiet environment has been chosen, emphasis is placed on time management. Weekly time charts and designing a personal schedule will be completed and discussed.

Week Three

Actively thinking is the core topic of this course. Emphasis is placed on listening instead of hearing and comprehension instead of reading. Finding and understanding the main topic will be stressed through a series of exercises using both written and oral applications. Using active listening skills in the BP Workplace will be covered at the end of this week.

Week Four

As a complement to Week Three's active thinking topics, note taking will be covered in this week. An appreciation of the need for taking accurate and quick notes will be discussed, including examples of both good and bad notes. Finding important details and remembering them in context to the main idea will also be covered. Once accurate notes are taken and reread, tests become easier to take and test anxiety is reduced. The second half of this week covers the three basic steps for test preparation and reviews ways to reduce test anxiety.

Week Five

Week Five integrates the ideas covered in the last four weeks. Instructor will ask attendees specific examples of how they have been able to use the skills covered and also discuss what problems they may have encountered. Several practices from previous topics will be given to ensure that comprehension and understanding were achieved. Applications of study skills within the BP Chemicals work environment will be discussed at length.

APPENDIX B

WELCOME

TO THE

ELECTRON DYNAMICS DIVISION

AND

EL CAMINO COLLEGE

WORKSHOP FOR

SUPERVISORS AND EDUCATORS

EDD/EL CAMINO COLLEGE
WORKSHOP
NOVEMBER 18, 1992
-AGENDA-

7:45 • COFFEE

8:00 • WELCOME/WORKSHOP PURPOSE

8:25 • EDD/ECC PARTNERSHIP OVERVIEW

8:45 • INTRODUCE SUPERVISORY INVOLVEMENT MODEL

9:00 -BREAK-

<u>WORKSHOPS</u>

I. CLASSROOM-TO-JOB-LINK

II. CLASSROOM APPLICATION EXPERT

III. ON-THE-JOB COACH

IV. PRIMARY TRAINER

11:15 • WRAP UP

11:30 • LUNCH
- GUEST SPEAKER: LOUIE AYALA
- VIDEO: INTRODUCTION TO THE LEARNING LAB

WORKSHOP OBJECTIVES:

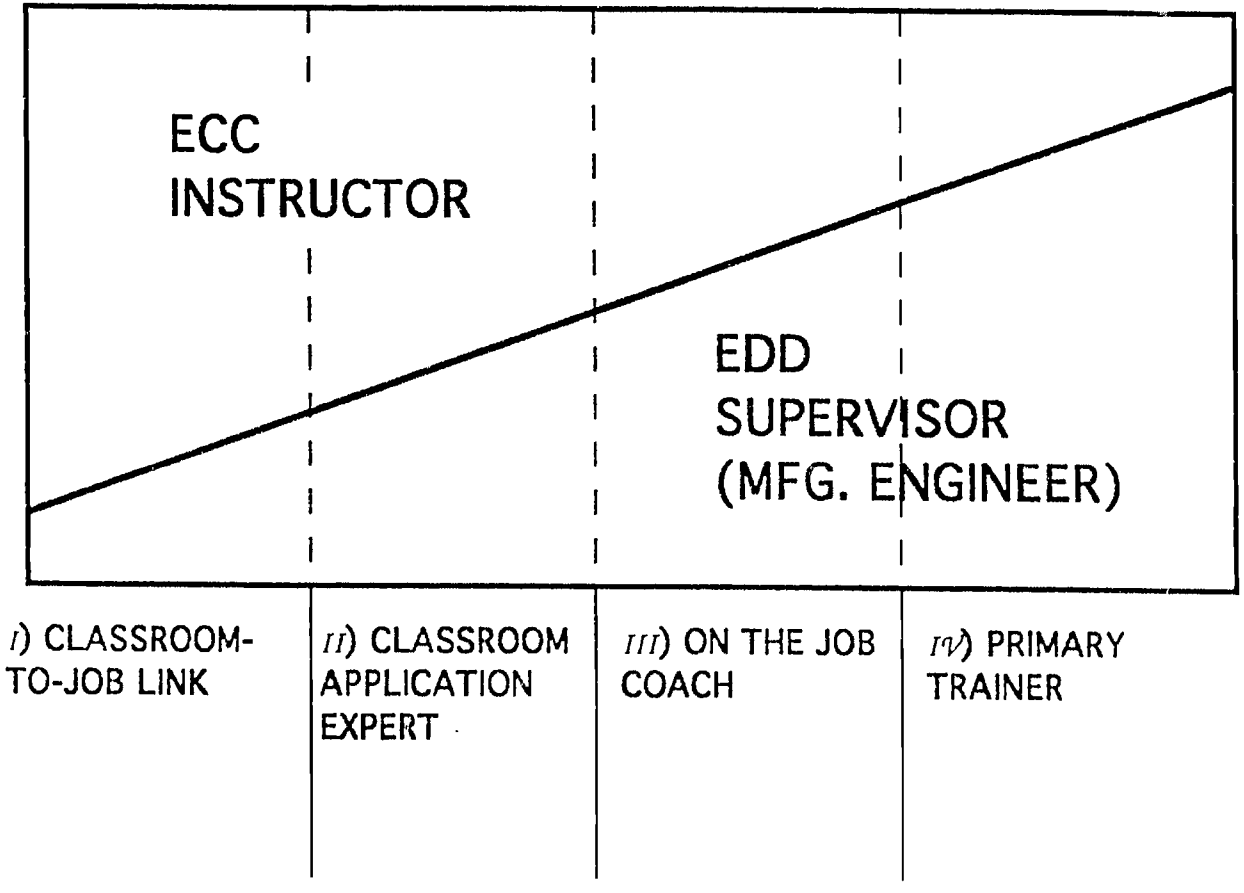
- UNDERSTAND THE EDD/ECC PARTNERSHIP AND HOW IT SUPPORTS MEETING DIVISION OBJECTIVES

- CLARIFY THE ROLE OF SUPERVISORS (AND OTHERS) IN THE ECC TRAINING PROCESS

- IDENTIFY SKILLS AND KNOWLEDGE NEEDED TO EFFECTIVELY TRAIN EDD EMPLOYEES; PRACTICE USING STEPS FOR EFFECTIVE "ON-THE-JOB" TRAINING (OJT)

63

EDD/ECC
COMPETITIVE SKILLS TRAINING
SUPERVISOR INVOLVEMENT MODEL



SPECIFIC ACTIONS

1. Ask Questions
2. Get familiar with the class concept
3. Demonstrate how the learning applies to employee's work
4. Encourage
5. Ask to look at homework or classwork
6. Get involved
7. Be on the alert for employees who are struggling:
   - tutoring program (future)
   - liaison to additional classes at El Camino or elsewhere

ARE YOUR EMPLOYEES STRUGGLING?

SIGNALS TO WATCH FOR:

- Decline opportunities for advancement
- Decline opportunities for added job responsibilities
- Don't answer area telephones or take written messages
- Depend heavily on a co-worker in the work environment
- Seem to lack motivation, desire or curiosity
- May be unaware of current events
- Taken written forms home to complete
- Won't have a checking account
- Won't follow or seem unaware of written instructions

TIPS FOR WORKING WITH ADULT LEARNERS

HOW ADULTS LEARN

1. Adults are goal oriented: "How will this help me in the real world?"
2. Adults learn best by doing, not by hearing or listening.
3. Adults are self directing. They prefer choices and a sense of control.
4. Adults bring a wealth of diverse experiences to the learning environment other than "book learning."
5. Adults work best in an environment of trust and rapport.

CHARACTERISTICS OF ADULT BASIC SKILLS LEARNERS

1. Easily discouraged
2. Need constant encouragement
3. Uneasy with traditional school setting; may resist "going back to school."
4. Appreciate acknowledgment of even minimal success

CHARACTERISTICS OF GOOD TRAINERS OR COACHES

1. Respect experiences and actively listen
2. Encourage constantly and give positive feedback
3. Begin work at a level at which the learner can succeed
4. Accept mistakes as the nature of learning
5. Take long term view of learning

APPLICATION EXPERT

1. Understands course content throughly
2. Provides specific tasks on the job that use specific elements of classroom learning.
3. Provides above practical knowledge in the classroom.
4. Engages in teaching apprenticeship role
5. Develops gradually into a subject matter expert

ECC/EDD

JOB SKILLS TRAINING

COMPUTATIONAL SKILLS CURRICULUM

CLASSES	GENERAL DESCRIPTION	TOOLS	DETAILS
2	ADDITION, SUBTRACTION OF DECIMAL NUMBERS	CALCULATOR, STEEL RULE, CALIPERS	PLACEMENT OF DECIMAL POINT NEGATIVE SIGNS ORDER OF OPERATIONS
2	MULTIPLICATION & DIVISION OF DECIMAL NUMBERS	CALCULATOR, STEEL RULE, CALIPERS	PLACEMENT OF DECIMAL POINT NEGATIVE SIGNS ORDER OF OPERATIONS
2	CONVERT FRACTIONS TO DECIMALS	TIME CARD, STRIP CHART	TIME,
2	ESTIMATE & ROUND RESULTS OF COMPUTATIONS	DIGITAL METERS	SIGNIFICANT DIGITS ACCURACY ORDER OF MAGNITUDE FOR ESTIMATING ANSWERS
2	SCALE & NOTATION	SPEC SHEETS, STRIP CHART	POSITIVE & NEGATIVE EXPONENTS POWERS OF TEN PREFIX NOTATION (MILLI, K)
2	UNIT CONVERSION	CALCULATOR STEEL RULE, SPEC SHEETS DIGITAL THERMOMETER	EX: KW to Db, C to F to K, PSI to TORR CANCELLATION OF UNITS
3	PERCENTAGE & TOLERANCE COMPARISON	SPEC SHEETS CALIPERS, BLUE PRINTS, SPEC SHEETS RODS/RINGS, GRAPHS	CALCULATE YIELD NOT GREATER THAN, NOT LESS THAN, RANGE ADDING NOMINALS & TOLERANCE
3	AVERAGES, CONTROL LIMITS & TRENDS	SPEC SHEETS CONTROL CHARTS	HOW TO FILL OUT XBAR & R CHART HOW TO FILL OUT ATTRIBUTE, PARETO CHART SPOTTING TROUBLE ON THE CHARTS
18			

ECC/EDD JOB SKILLS: EXAMPLE PROBLEMS

	SKILL	DESCRIPTION	EXAMPLE
1	ADD / SUBTRACT	OFFSETS	WELD SCOPE CROSSHAIRS .035 FROM TARGET
2	ADD / SUBTRACT	SELECT TO FIT	PIN TO HOLE
3	ADD / SUBTRACT	SHIM TO DIMENSION	M-1 DISPLACER LENGTH
4	AVERAGES	AVERAGE LENGTH	CIRCUIT WITH PARELLELISM
5	AVERAGES	AVERAGE TEMPERATURE	MULTIPLE THERMOCOUPLES
6	CONVERSION FACTORS	TEMPERATURE	SPEC IN C, ENVIRONMENTAL CHAMBER IN F
7	CONVERSION FACTORS	TIME	SPEC IN DECIMAL TIME, HAVE TO USE WALL CLOCK
8	LIMIT / RANGE	CONCENTRICITY	GUN BODY TO CATHODE
9	LIMIT / RANGE	MAX LIMIT / MIN LIMIT	VACUUM
10	MULTIPLY / DIVIDE	TIME BASE "LENGTH" TO FREQUENCY	OSCILLISCOPE
11	MULTIPLY / DIVIDE	VOLTAGE x CURRENT = POWER	INPUT POWER
12	MULTIPLY / DIVIDE	VOLUME	BRAZE FORMS (2x 015"Dia vs 1x 030"Dia)
13	MULTIPLY / DIVIDE	WEEKS WORK TO PER DAY RATE	KIT ISSUES
14	PERCENTAGE	CONCENTRATIONS	3% ACID SOLUTION
15	PERCENTAGE	MIXING RATIOS	60/40 EPOXY, FILLER TO CATALYST
16	PERCENTAGE	YIELD	DEFECTIVE ITEMS, DEFECTS PER ITEM
17	TOLERANCE / SIG FIGS	KEEPING SIGNIFICANT ZEROS	RESISTANCE IN CATHODE LAB (1.6 x 1.81)
18	TOLERANCE / SIG FIGS	PLOTTING	RECORDING MORE DECIMALS THAN CHARTING
19	TOLERANCE / SIG FIGS	PRESSURE	PRESSURE ± TOLERANCE (PSIG, PSIA)
20	TOLERANCE / SIG FIGS	TEMPERATURE	BRAZE FURNACE
21	TOLERANCE / SIG FIGS	WEIGHTS	CHEMICALS ± TOLERANCE (GRAMS)
22			
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COACH ON THE JOB

PROVIDE TRAINING ON THE JOB

- Create non-threatening environment
- Utilize adult learning principles
- Listen
- Meet communication challenges
- Reinforce learning and skill building

TRAINING TIPS

1. Decide what is the *main* point to communicate.
2. Determine the proper sequence of an explanation.
3. Demonstrate through visuals, charts, or perhaps brief, written explanations.
4. Simplify the explanation: use "simple" words.
5. Be aware of information overload.
6. Pay attention to employees' nonverbal cues signaling a lack of understanding.
7. Use consistent terminology.
8. Speak clearly; annunciate.
9. *Emphasize* the key words.
10. Avoid slang.
11. Limit the use of yes/no questions or "Do you understand...?"
12. Be patient.
13. Don't get frustrated; stay cool.
14. Other:_____

_____

_____

STEPS FOR ON THE JOB TRAINING (OJT)

1.	Prepare	• Prepare yourself • Prepare trainee • Put the learner at ease
2.	Present	• Trainer tell, trainer do
3.	Tryout	• Trainee tell, trainee do • Trainee tell, trainer do (optional)
4.	Follow Up	• Link learning with actual job responsibilities

APPENDIX C

EL CAMINO COLLEGE
DIVISION OF VOCATIONAL & WORKPLACE EDUCATION
INDIVIDUALIZED EDUCATIONAL PLAN

NAME: _____ EMPLOYEE ID #: _____

DEPARTMENT: _____ WORK PHONE: _____

JOB TITLE: _____

FIRST LANGUAGE: ☐ English ☐ Other _____

SEX: ☐ Male ☐ Female *AGE:* ☐ 18-24 ☐ 25-29 ☐ 30-39 ☐ 40-49 ☐ 50 and over

EDUCATION:

Years *inside* the United States
- ☐ 0-6 years
- ☐ 6-11 (non High School graduate)
- ☐ High School graduate
- ☐ G.E.D.
- ☐ Adult School/Trade School
- ☐ Community College
- ☐ University (Number of years _____)

Years *outside* the United States
- ☐ 0-6 years
- ☐ 6-11 (non High School graduate)
- ☐ High School graduate
- ☐ Vocational or Trade School
- ☐ University (Number of years _____)

The calendar year that you last attended any school or training: _____

ABLE RESULTS: RC _____ NO_____ PS _____ WR _____ N/A _____

BARRIERS FOR CONTINUING EDUCATION: ☐ LIMITED ENGLISH ABILITY ☐ HEALTH ☐ TIME
☐ CHILD/ADULT CARE ☐ FAMILY PROBLEMS ☐ OTHER _____ _____

NOTES:

NAME _____

CURRENT TRAINING NEEDS

PLANNED ACTIVITIES	PROVIDER	ESTIMATED START DATE	ESTIMATED COMPLETION	COMMENTS

GOALS AT CURRENT WORKPLACE

GOAL #1 _____ GOAL #2 _____

INDEPENDENT EDUCATIONAL ACTIVITIES	PROVIDER	ESTIMATED START DATE	ESTIMATED COMPLETION	COMMENTS

LONG TERM CAREER GOALS

GOAL #1 _____ GOAL #2 _____

INDEPENDENT EDUCATIONAL ACTIVITIES	PROVIDER	ESTIMATED START DATE	ESTIMATED COMPLETION	COMMENTS

The intent of this educational plan is to help clarify career goals. The data may be used for statistical purposes, but will not be released as individual employee data unless prior written approval is obtained by employee. For more information please call the Workplace Learning Resource Center at El Camino College (310) 715-3351.

HUGHES EDUCATIONAL PLANS
EMPLOYEE COMMENTS

Class has taught her enough to encourage her to learn more.

Math class has enabled her to help her kids with their homework.

Computer lab too busy at lunchtime.

Glad she had math class in case she gets called back to inspection.

On-the-job training is so much nicer. Hadn't been interested in school before.

Almost everyone is interested in computer lab

There would be less broken parts if employees had electronics training. Instead of just working like robots, explain the parts and why they are so delicate. Employees need more technical training. (Many supervisors don't really understand themselves, so the employees don't get trained.)

MATH:

10% felt it was too easy
40% felt it was a much needed refresher
50% felt it was too hard and too fast

- Book had mistakes (session II)
- Too fast, way too fast (Instructor: Walter, Session I)
- Math helps with understanding job.
- Needs to be longer -- great class!
- Math book very helpful as a resource.

ESL:

- Only a few felt it was a review.
- Needs accent reduction
- Sentence structure still a problem -- selecting right word and putting in correct order
- Needs to include more grammar

BLUEPRINT:

- Most students thought the class was great and felt the instructors were excellent and made sure students understood.
- Blueprint reading is very applicable to the job
- Two people said the homework was difficult, and there was too much of it. Need to review homework lessons, rather than just continuing.
- Several stated the blueprints and books needed to be more relevant
- Pre-test was embarrassing

Second session of BP: Supervisors did not inform employees they would need to put in some of their own time.

HUGHES INDIVIDUAL EDUCATIONAL PLANS

SEX	18-24	25-29	AGE 30-39	40-49	50+	CLASS	INFO REQ	BARRIER ([illegible])	CLASSES REQUESTED						
									DP	COMPUTERS	ESL	ENGLISH GRAMMAR	ADV MATH	ELECTRONICS	OTHER
F					X	M	1,2,3,5,7	RETIREMENT	X	X					
F					X	E	7					X			
F				X		E	1,2,3,5	LIMITED ENG.		X	X				
F					X	M	1,2,3,7	SHIFTS, NIGHT DANGERS		X				X	
F					X	M	1,5,7		X						
F			X			M	2,5		X	X				X	
F					X	E,M	2	LIMITED ENG		X		X			
F				X		M	3,4,5								
F			X			M	1,2,5,7	CHILD CARE	X	X			X		
F					X	M,B		[illegible]							
M				X		M	1,2	CHILD CARE	X	X					
M			X			M	1,2	ATTITUDE	X	X		X			
M			X			M	1,2,3,5,7		X						
F				X		M	1	NO INTEREST		X			X		
F					X	M	1,7		X						
F				X		E	7	CHILD CARE, LAZY				X		X	
M				X		M	6	NO INTEREST	X						

LANGUAGE: E=Engl A=Amer Indian F=French G=German J=Japanese K=Korean P=Pilipino S=Spanish T=Thai V=Viet
CLASS: M=Math E=English B=Blue Print Reading
INFO REQ: 1=Adult School/Community Ed 2=SCROC 3=Comm College 4=Univ 5=Gen Career Info 6=Small Business 7=Other

HUGHES INDIVIDUAL EDUCATIONAL PLANS

SEX	AGE 18-24	25-29	30-39	40-49	50+	CLASS	INFO REQ	BARRIER	CLASSES REQUESTED						
									BP	COMPUTERS	ESL	ENGLISH GRAMMAR	ADV MATH	ELECTRONICS	OTHER
F					X	E	7	LIMITED ENG							
F					X	E	2,3,5	LIMITED ENG							CMI
M				X		M	1	TOO BUSY		X					
M			X			M		NO INTEREST	X						
F				X		M, B	1,6,7			X					
M			X			M,B	1,5,7	TOO BUSY		X					
F				X		M	3,5						X		
F					X	E	1,3	LIMITED ENG			X	X			
M			X			E	2,3,5,6			X					
F				X		E	1,2,3,7			X				X	
M			X			E	3,6	LIMITED ENG		X		X	X	X	
F					X	M,B	5,7	RETIREMENT							
M			X			M	2,3,5	CHILD CARE	X						
M			X			M	2,3,5,7		X	X					
M				X		M,B	1	BUSY LIFE	X	X			X	X	
M				X		M	2,3,4,5	BUSY LIFE	X	X				X	
F			X			M	3,7			X			X		
M			X			M	2,5,7							X	
F				X		M		CAR/ENG LIMIT							
F					X	M	1,2,3,5	CHILDCARE/CAR		X					
F			X			M	2,3,5	CHILD CARE							

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HUGHES INDIVIDUAL EDUCATIONAL PLANS

SEX	18-24	25-29	AGE 30-39	40-49	50+	CLASS	INFO REQ	BARRIER	CLASSES REQUESTED						
									BP	COMPUTERS	ESL	ENGLISH GRAMMAR	ADV MATH	ELECTRONICS	OTHER
F					X	M,B	1,3,7	NO INTEREST				X			
F				X		E	2,6,7			X					
F			X			M	2,6,7		X	X					
F					X	M,B	1,3,5,7								
F				X		B	2,3,7		X	X				X	
F				X		M	1,2,3,5,7			X		X			
F				X		M	3,4,5	Domestic No spousal support	X						
M				X		M	4,5		X						
F			X			M	2,5,7	CHILD CARE	X	X		X			
F				X		E	1,2,3,5	LIMITED ENG		X			X		
F				X		E,B	1,7	CHILD CARE		X					

LANGUAGE: E=Engl A=Amer Indian F=French G=German J=Japanese K=Korean P=Pilipino S=Spanish T=Thai V=Viet
CLASS: M=Math E=English B=Blue Print Reading
INFO REQ: 1=Adult School/Community Ed 2=SCROC 3=Comm College 4=Univ 5=Gen Career Info 6=Small Business 7=Other

APPENDIX D

FEDERAL PROJECT
DEMOGRAPHIC SURVEY

Please fill out this survey as accurately as you can. This information will help us comply with federal regulations for this project. Thank you for your cooperation.

Ethnicity

_____ Asian

____ Cambodian
____ Chinese
____ Filipino
____ Japanese
____ Korean
____ Vietnamese
____ Other

_____ Black (not Hispanic)
_____ Hispanic
_____ Native American
_____ Pacific Islander
_____ White (not Hispanic)
_____ Other (i.e. Middle East origin, Indian Subcontinent origin, etc.)

If "Other," please state:_____

Sex

_____ Male
_____ Female

Age

_____ 18 to 24
_____ 25 to 29
_____ 30 to 39
_____ 40 to 49
_____ 50 and over

Education

Years **inside** the United States

_____ 0 to 6 years
_____ 6 to 11 (non H.S. graduate)
_____ High School graduate
_____ G.E.D.
_____ Adult School/Trade School
_____ Community College
_____ University
Number of years:_____

Years **outside** the United States

_____ 0 to 6 years
_____ 6 to 11 (non H.S. graduate)
_____ High School equivalent
_____ Vocational or Trade school
_____ University
Number of years:_____

OPTIONAL: The federal government would like to know how many single parents we are serving. Your cooperation is appreciated.

I am a single parent:

_____ YES _____ NO

APPENDIX E

FINAL EVALUATION

DIRECTIONS: Please circle one number in each row to show how your would rate each item.
Example:

I love to work overtime	5	4	3	2	1	I don't like to work overtime

If you enjoy working overtime, you would circle 4 or 5. On the other hand, if you hate working overtime you would circle 1. If you have no strong opinion, you would circle 3.

A. How would you rate this class?

1. useful on the job	5	4	3	2	1	useless on the job
2. useful outside of work	5	4	3	2	1	useless outside of work
3. much too difficult	5	4	3	2	1	much too easy
4. too fast a pace	5	4	3	2	1	too slow a pace
5 very interesting	5	4	3	2	1	boring
6. what I expected	5	4	3	2	1	not what I expected

Comments (continue on back if necessary)

_____

B. How would you rate the materials (books, handouts, visual aids, etc.)

1. easy to learn	5	4	3	2	1	hard to learn

Comments (continue on back if necessary)

_____

C. If you could change the program, what would you change? (continue on back if necessary)

_____

_____

D. Are you interested in working with a tutuor to improve your skills?

Yes ____ No ____

Would you work with a tutuor on your time?

Yes ____ No ____

If so, what times?

_____

SUPERVISOR EVALUATION
Hughes, Electron Dynamics Division

Course Title:_____

Course Duration:_____

DIRECTIONS: Please fill out this survey. Your candid responses are appreciated and will help us to improve this project. Thank you for your continued support.

To what degree have you observed the following behaviors among your employees who participated in the above course?

1. Increased productivity on the job:

☐ increased ☐ stayed the same ☐ decreased

2. Reduction of errors on the job:

☐ decreased ☐ stayed the same ☐ increased

3. Increased motivation on the job:

☐ increased ☐ stayed the same ☐ decreased

4. Better communication and/or cooperation with other employees:

☐ better ☐ stayed the same ☐ worse

5. Applied course content to the job:

☐ frequently ☐ sometimes ☐ never

Comments:_____

_____

_____

6. How satisfied are you with the usefulness of the course content?

☐ very satisfied ☐ somewhat satisfied ☐ needs improvement

7. How satisfied are you with your role in the project and knowing what is being taught?

☐ very satisfied ☐ somewhat satisfied ☐ needs improvement

8. What suggestions do you have to improve this program (continue on back if necessary)?

_____

_____

_____

_____

9. Other Comments (continue on back if necessary):

_____

_____

_____

_____