ACAP

Austin Competency Analysis Profile

Engineering Design Graphics

Conducted

November 3 and 4, 1999

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ACAP Process Overview

What are Austin Competency Analysis profiles (ACAPs)?

Austin Competency Analysis profiles (ACAPs) are competency lists that are verified by expert workers called Subject Matter Experts or SMEs, that evolve from a well-established job analysis process involving business, industry, labor, and community agency representatives from throughout the Austin area.

How is an Austin Competency Analysis Profile used?

Each ACAP identifies the occupation, academic, and employability skills (or competencies) needed to enter a given occupation or occupational area. The ACAP not only lists the competencies but also clusters those competencies into broader units and details the knowledge, skills, and attitudes (competency builders) needed to perform each competency.

Within the competency list are two levels of items: core and advancing. Core items, which are essential for entry-level employment, are required to be taught. Advancing items are those needed to advance in a given occupation, and are designated by a superscripted "a". If core competencies or competency builders are present in "advancing" unit, then they are designated with a superscripted "c".

Educational institutions may add as many units, competencies, and/or competency builders as desired to reflect local employment needs, trends, and specialties. Local advisory committees are actively involved in the identification and verification of additional items. Faculty members formulate their courses of study using the varied contents of the ACAP. Faculty also monitor gains using many forms of assessment.

Engineering Design Graphics

ACAP Session Schedule

November 3-4, 1999

Wednesday, November 3

Welcome and Introductions

Brainstorm: *What do people need to know and be able to do as an entry-ready*
 employee in this occupation?

Process overview:
        Purpose~Why are we here?
        Review definitions
        Identify outcomes

Verify Units

~Lunch Break~

Verify Competencies

Verify Competency Builders

Thursday, November 4

Continue Verifying Competency Builders

Review Technical Manuals and Materials Brought by SMEs

~Lunch Break~

Develop Work Keys Occupational Profile

Review and Wrap Up

ACAP: Engineer Design Graphics

Occupational Competencies

UNITS

Unit 1:   **Fundamental Drafting Skills**

Unit 2:   **Fundamental Computer Skills**

Unit 3:   **Basic CAD Skills**

Unit 4:   **Advanced CAD Skills**

Unit 5:   **Mechanical**

Unit 6:   **Electronics**

Unit 7:   **Integrated Circuit Design**

Unit 8:   **Civil**

Unit 9:   **GIS**

Unit 10:   **Architectural**

Unit 1   Fundamental Drafting Skills

Competency 1.1   Use basic drafting skills

Competency Builders:

1.1.1   Choose appropriate drawing media and related drafting
          materials (e.g., papers, vellum, mylar, platter, toner
          cartridges)
1.1.2   Measure accurately using basic measurement systems (e.g.,
          fractions, decimals, and metric measurements)
1.1.3   Add correct annotation to drawing
1.1.4   Identify components of drawings (e.g., layouts, blueprints
          and schematic drawings)
1.1.5   Create a free-hand sketch
1.1.6   Reproduce originals to scale using different methods (e.g.,
          photocopy and blueprint)

**Competency 1.2   Use orthographic projections (not applicable
                          to GIS or IC)**

Competency Builders:

1.2.1   Identify appropriate views (e.g., orthographic, auxiliary, and
          section
1.2.2   Choose appropriate orthographic views
1.2.3   Place appropriate orthographic views

Competency 1.3   Make pictorial drawings

Competency Builders:

1.3.1   Identify drawings (e.g., isometric and oblique)
1.3.2   Create isometric drawings (e.g., isometric and oblique)
1.3.3   Create oblique drawings (e.g., cabinet, cavalier)

Competency 1.4   Apply dimensioning to graphics

Competency Builders:

1.4.1   Apply dimensioning rules correctly (e.g., avoid redundant
          dimensioning, use appropriate dual dimensioning standards,
          use size and location dimension practices.
1.4.2   Use correct dimension line terminators (e.g., arrowheads,
          ticks, slashes)

1.4.3   Dimension objects (e.g., lines, arcs, angles, circular)
1.4.4   Dimension complex shapes (e.g., spheres, cylinders, tapers, pyramids)
1.4.5   Dimension features from a center line
1.4.6   Dimension a theoretical point of intersection
1.4.7   Use various dimensioning styles (e.g., Cartesian, polar, ordinate, datum)

Competency 1.5   Use appropriate resources

Competency Builders:

1.5.1   Interpret data from data sheets
1.5.2   Apply data to working drawings
1.5.3   Locate appropriate resources

Unit 2   Fundamental Computer Skills

Competency 2.1   Operate computer hardware

Competency Builders:

2.1.1   Use proper maintenance for equipment
2.1.2   Operate input devices (e.g., mouse, keyboard, digitizer)
2.1.3   Adjust input devices (e.g., mouse, keyboard, digitizer)
2.1.4   Operate output devices (e.g., printers, plotters)
2.1.5   Adjust output devices (e.g., printers, plotters)
2.1.6   Handle and operate storage media correctly
2.1.7   Start and shut down work station
2.1.8   Adjust monitor controls for maximum comfort and usability
2.1.9   Utilize available information services (e.g., electronic mail, bulletin boards)

Competency 2.2   Apply physical and safety needs standards

Competency Builders:

2.2.1   Apply standards of ergonomic considerations (e.g., keyboard position, screen position, lighting)
2.2.2   Apply personal safety standards (e.g., electrical and mechanical hazards)

Competency 2.3   Use operating systems

Competency Builders:

2.3.1   Start and exit a software program as required
2.3.2   Apply proper file management techniques (e.g., copying,
            deleting, change read/write permissions)
2.3.3   Format floppy disk
2.3.4   Identify directory
2.3.5   Create directory
2.3.6   Use directory
2.3.7   Change directory paths (i.e., local, network)
2.3.8   Maintain files properly
2.3.9   Use proper file backup procedures
2.3.10   Translate data files between formats
2.3.11   Import data files between formats
2.3.12   Export data files between formats
2.3.13   Use web browsers, e-mail, and file transfer
2.3.14   Use on-line help
2.3.15   Save drawings to proper storage devices
2.3.16   Manage windows
2.3.17   Use basic office applications (e.g., word processing and
            spreadsheet)

Unit 3   Basic CAD Skills (Not applicable to IC)

Competency 3.1   Manipulate screen layout

Competency Builders:

3.1.1   Locate toolbars
3.1.2   Use input commands (e.g., mouse, buttons, menus, toolbars,
            keyboard)
3.1.3   Set drawing tools (e.g., layer settings, grid, snap, grips,
            osnap, paper space/model space, ortho on/off, crosshair,
            basic selection sets, color of screen, text)

Competency 3.2   Create 2-D drawings

Competency Builders:

3.2.1   Create new drawings

3.2.2	Perform drawing set up (e.g., set drawing limits, extents, units, styles)
3.2.3	Create prototype drawings
3.2.4	Construct geometric figures (e.g., lines, splines, circles, and arcs)
3.2.5	Create text using appropriate style and size to annotate drawings
3.2.6	Use accuracy enhancements tools (e.g., entity positioning methods such as snap and XYZ)
3.2.7	Control accuracy enhancement tools (e.g., entity positioning methods such as snap and XYZ)
3.2.8	Identify appropriate symbols/libraries
3.2.9	Create appropriate symbols/libraries
3.2.10	Store appropriate symbols/libraries
3.2.11	Apply appropriate symbols/libraries

Competency 3.3   Edit graphics

Competency Builders:

3.3.1	Utilize geometry editing commands (e.g., text, drawing format)
3.3.2	Utilize non-geometric editing commands (e.g., text, drawing format)
3.3.3	Use drawing modification commands (e.g., stretch, move, copy, erase, scale, extend)
3.3.4	Use other editing commands such as poly line editing and dimension editing

Competency 3.4   Manipulate graphics

Competency Builders:

3.4.1	Control coordinates and display scale
3.4.2	Control entity properties (e.g., color, line type, line weight, layer control)
3.4.3	Use viewing commands (e.g., zooming, panning)
3.4.4	Use standard parts and/or symbol libraries
3.4.5	Use grouping techniques
3.4.6	Minimize file size (i.e., purge when appropriate, create blocks, external referencing)
3.4.7	Use arrays and multiple copies as appropriate

Competency 3.5   Analyze product

Competency Builders:

3.5.1   Use inquiry commands to obtain information from drawing
               database (e.g., entity characteristics, distance, area, status)
3.5.2   List attribute information from symbols

Competency 3.6   Apply dimensioning tools

Competency Builders:

3.6.1   Use associative dimensioning correctly
3.6.2   Create proper dimensioning styles

Competency 3.7   Manage drawings production

Competency Builders:

3.7.1   Manage model/paper space
3.7.2   Configure plotting parameters
3.7.3   Provide the attribute value to the title block

Competency 3.8   Use other CAD related operations

Competency Builders:

3.8.1   Use CAD environment toolbars
3.8.2   Use F2
3.8.3   Use escape
3.8.4   Use command line
3.8.5   Use help
3.8.6   Use additional editing commands (trim, copy, rotate, offset,
               fillet, chamfer, change properties)
3.8.7   Make isometric drawings using isometric angles (30, 150,
               210, 330)
3.8.8   Print dialog box basics

Unit 4   Advanced CAD skills

Competency 4.1   Use specialized CAD techniques

Competency Builders:

4.1.1	Manipulate/define symbol attributes
4.1.2	Export/import external information (e.g., SQL database, spreadsheet)
4.1.3	Use user coordinate systems and manipulation of user coordinate space
4.1.4	Create view port
4.1.5	Manipulate view port
4.1.6	Perform customization to improve productivity (e.g., customize menus, function keys, script files, macros)
4.1.7	Manipulate associated non-graphical data
4.1.8	Recognize value of system variables.

Competency 4.2   Create 3D models (not applicable to Civil, IC, or GIS)

Competency Builders:

4.2.1	Create solid models
4.2.2	Create primitives using appropriate modeling (e.g., box, wedge, cone, sphere, cylinder)
4.2.3	Perform Boolean operations (e.g., union, subtraction intersection)
4.2.4	Create feature based geometry (e.g., fillets, chamfers)
4.2.5	Create section views
4.2.6	Use display commands (e.g., hide lines, rendering shading)
4.2.7	Create 2D geometry from 3D model (create solid profile)
4.2.8	Revolve a profile to create a 3D solid

Competency 4.3   Create surface models

Competency Builders:

4.3.1	Create 3D wire frame from 2D geometry
4.3.2	Create surfaces
4.3.3	Manipulate viewpoints to edit
4.3.4	Manipulate coordinate system
4.3.5	Revolve a profile to create a 3D surface

Competency 4.4   **Edit graphics**

Competency Builders:

4.4.1   Manipulate surface
4.4.2   Manipulate surface normals
4.4.3   Edit control points (e.g., surfaces, Bezier)
4.4.4   Modify geometry via Boolean operations
4.4.5   Edit primitives (e.g., moving, copying, resizing)

Competency 4.5   **Manipulate graphics**

Competency Builders:

4.5.1   Perform axis view clipping
4.5.2   Extract wire frame data from surface/solid geometry
4.5.3   Shade/render object (e.g., reflectivity, opacity)

Competency 4.6   **Analyze graphics**

Competency Builders:

4.6.1   Extract geometric data
4.6.2   Extract attribute data
4.6.3   Identify gaps in non-intersecting surfaces
4.6.4   Obtain surface properties data (e.g., area, perimeter, bounded volume)
4.6.5   Obtain mass properties data (e.g., moments of inertia, centroids)

Competency 4.7   **Demonstrate CAD productivity and work habits**

Competency Builders:

4.7.1   Prioritize tasks
4.7.2   Solicit feedback
4.7.3   Estimate timelines
4.7.4   Focus on the most important points of a design/drawing
4.7.5   Develop geometry using parametric programs

Unit 5   Mechanical (specialization)

Competency 5.1   Construct exploded assembly drawings

Competency Builders:

5.1.1   Construct isometric exploded assembly drawings
5.1.2   Label exploded assembly drawings

Competency 5.2   Employ traditional drafting techniques

Competency Builders:

5.2.1   Make free-hand multi-view and isometric dimensioned
           sketches
5.2.2   Free-hand letter in a style and quality appropriate to the
           engineering graphics environment
5.2.3   Use drafting tools required of technicians in the professional
           engineering graphics environment
5.2.4   Create drawings using the metric, engineer's and architect's
           most commonly used scales
5.2.5   Create accurate geometric constructions
5.2.6   Create orthographic/multi-view drawings
5.2.7   Use miter line construction techniques
5.2.8   Project information from one view to the next
5.2.9   Employ line conventions and weights that comply with the
           latest ASME and ISO standards
5.2.10   Operate a blue-line machine
5.2.11   Adjust print darkness and quality
5.2.12   Dimension/Tolerance orthographic drawings complying with
           ASME (ASME Y14.5-199X) and ISO standards
5.2.13   Create section views of common objects
5.2.14   Identify different types of sections (full, half, revolved,
           removed and aligned)
5.2.15   Employ proper conventions for applying cutting-plane and
           section lines
5.2.16   Create isometric drawings of machine parts
5.2.17   Orient isometric ellipses correctly
5.2.18   Set-up orthographic, isometric and 3D CAD drawings
5.2.19   Construct orthographic, isometric and 3D CAD drawings
5.2.20   Dimension orthographic, isometric and 3D CAD drawings
5.2.21   Letter orthographic, isometric and 3D CAD drawings
5.2.22   Print orthographic, isometric and 3D CAD drawings

Competency 5.3   Apply theory and practice to drawings

Competency Builders:

5.3.1   Apply the processes of visualization of orthographic, isometric, and section view
5.3.2   Explain the theory and practice of dimensioning
5.3.3   Apply the theory and practice of dimensioning
5.3.4   Explain the importance of standards (ASME and ISO) in modern engineering graphics environment

Competency 5.4   Create machine drawings using modern engineering graphics techniques and conventions using CAD

Competency Builders:

5.4.1   Design a simple machine
5.4.2   Convert to 2D orthographic and ISO view
5.4.3   Create 3D models of machine parts
5.4.4   Create section, auxiliary and isometric view of machine parts
5.4.5   Document each step from conception through implementation drawings
5.4.6   Create fabrication drawings (complete set—includes parts list, drawing list, callout, border, and any other notes and/or labeling, correct dimensioning techniques)
5.4.7   Assemble view (complete set—includes parts list, drawing list, callout, border, and any other notes and/or labeling, correct dimensioning techniques)
5.4.8   Specify threads, fasteners and other hardware
5.4.9   Depict threads, fasteners and other hardware
5.4.10   Use appropriate countersink and counterbolt callout
5.4.11   Produce free-hand sketches
5.4.12   Transmit data visually, clearly
5.4.13   Translate vector data to other software programs
5.4.14   Apply CAD rendering techniques (materials, lighting, shading)

Competency 5.5   Do work in various media

Competency Builders:

5.5.1   Describe the basic drawing process
5.5.2   Apply the basic sketching techniques of contour and quick gesture
5.5.3   Use free-handwriting and control handwriting in sketching

5.5.4	Use the three methods for measuring an object to be sketched: midpoint, plumb and level, and comparative measurements
5.5.5	Define the four ways to create the illusion of depth
5.5.6	Produce shade and shadow on an object
5.5.7	Use the two-point set up to draw perspectives
5.5.8	Use the one point set up to draw perspectives
5.5.9	Prepare the Auto CAD settings required for isometric drawings
5.5.10	Use ellipses in isometric drawings
5.5.11	Use the three dimensional coordinate entries X, Y, and Z
5.5.12	Use commands for the construction of solid models
5.5.13	Apply rendering techniques on solid models
5.5.14	Draw an exploded view of an object
5.5.15	Use basic CorelDraw commands
5.5.16	Create a page for a catalog using an exploded solid model and CorelDraw

Competency 5.6   Use ANSI and ISO standard practices to design with dimensioning and tolerancing

Competency Builders:

5.6.1	Apply criteria for proper materials selection in design of mechanical parts
5.6.2	Name consideration needed for selecting an appropriate production process for a machine part design
5.6.3	Identify production processes that were used in making typical parts by examining them
5.6.4	Produce accurate 2D parts drawings using AutoCAD 2000 software
5.6.5	Dimension details of designed parts in compliance with ASME and ISO standard techniques
5.6.6	Calculate and properly specify dimensional tolerances for standard fit parts in both English and metric systems
5.6.7	Produce a full working drawing set of professional quality

Competency 5.7   Employ computer graphics databases for modern prototyping and machining methods

Competency Builders:

5.7.1	Create parametric solid models of moderately complex parts
5.7.2	Create multi-view drawings of modeled parts
5.7.3	Dimension part details in compliance with ASME and ISO standards

5.7.4	Combine these parts into complete functional products
5.7.5	Model geometry using the design function included in machining software
5.7.6	Generate tool path data for machining parts
5.7.7	Set up a machine and produce a part
5.7.8	Place dimensioning and tolerancing (GD&T) on drawings when appropriate

Competency 5.8   **Build mechanical systems (HVAC, mechanical and process piping)**

Competency Builders:

5.8.1	Use specifications
5.8.2	Identify standard symbols (process, instrumentation)
5.8.3	Create schematic drawings
5.8.4	Design piping systems from schematic (multiple services) through building
5.8.5	Identify issues affecting system usability (maintenance/operator access, testing, future expansion)
5.8.6	Calculate pressures and flow
5.8.7	Make updates/additions to system components
5.8.8	Create new working system to incorporate updates
5.8.9	Create fabrication drawings with parts lists using industry standards (isometric spool drawings, sheet metal drawings)

Unit 6   Electronics (Specialization)

Competency 6.1   **Apply principles of drawing electronic schematics and logic diagrams**

Competency Builders:

6.1.1	Utilize CAD techniques
6.1.2	Make free-hand sketches of schematic diagrams
6.1.3	Create schematics and logic diagrams from engineering sketches following guidelines of good design
6.1.4	Identify the components used in schematic and logic diagrams
6.1.5	Identify the reference designations used in schematic and logic diagrams
6.1.6	Correctly assign component sequence numbering to electronic symbols
6.1.7	Correctly assign component values to electronic symbols

Competency 6.2   **Describe and demonstrate the process of layout and documentation of circuit diagrams**

Competency Builders:

6.2.1   Place connection dots in the proper positions on electronic diagrams
6.2.2   Create electro/mechanical drawings
6.2.3   Dimension orthographic drawings complying with ASME and ISO standards
6.2.4   Create a parts list for an electronic assembly
6.2.5   Create pictorial drawings of mechanical parts

Competency 6.3   **Explain the terminology of electronic drawing and electronic symbology**

Competency Builders:

6.3.1   Use electronic symbol libraries and create symbols with the block command
6.3.2   Set up CAD drawings
6.3.3   Construct CAD drawings
6.3.4   Dimension CAD drawings
6.3.5   Letter CAD drawings
6.3.6   Print Orthographic and isometric CAD drawings

Competency 6.4   **Use CAD tools to develop the fundamentals of printed wiring board design**

Competency Builders:

6.4.1   Use Unix command language
6.4.2   Manipulate files

Unit 7   Integrated Circuits Layout and Design

Competency 7.1   **Examine IC fabrication process (pre-requisite)**

Competency Builders:

7.1.1   Recognize the steps in the process
7.1.2   Relate layout masks to design steps

7.1.3   Interpret the cross section of a CMOS device

Competency 7.2   Integrate digital logic (pre-requisite)

Competency Builders:

7.2.1   Use binary numbering systems
7.2.2   Use binary addition and subtraction
7.2.3   Use binary logic (OR, AND, NAND, NOR)

Competency 7.3   Manage UNIX systems

Competency Builders:

7.3.1   Use appropriate commands
7.3.2   Use appropriate file structure
7.3.3   Use simple shell scripts

Competency 7.4   Apply basic electronics skills

Competency Builders:

7.4.1   Calculate current and voltage
7.4.2   Determine the relationship between current and voltage
7.4.3   Calculate resistance and capacitance
7.4.4   Identify the effects of resistance and capacitance
7.4.5   Read schematics
7.4.6   Identify circuit types
7.4.7   Convert symbols to transistor equivalent circuits

Competency 7.5   Apply the fundamentals of CMOS layout

Competency Builders:

7.5.1   Identify schematic design symbols for basic CMOS circuits and devices
7.5.2   Identify the components in the CMOS transistor cross section
7.5.3   Translate design schematics to layout shapes
7.5.4   Select the proper shapes and the placement of the shapes in relationship to each other in accordance with design rules
7.5.5   Fold gates when gate length exceeds maximum value
7.5.6   Fold gates when appropriate to the design
7.5.7   Share diffusion where appropriate
7.5.8   Minimize transistor drain

7.5.9	Interconnect circuit nodes with metal lines of sufficient dimension to carry the current load
7.5.10	Maximize contact and via cuts as appropriate
7.5.11	Minimize the area required for a given circuit
7.5.12	Ensure sufficient substrate and well ties (taps) exist
7.5.13	Place text in the design as required by the design schematic
7.5.14	Translate resistor values to appropriate the layout dimensions
7.5.15	Utilize the Cadence design tool to draw circuit layout
7.5.16	Utilize design hierarchy to build cells containing subcells
7.5.17	Recognize the components that are required to build a complete chip

Competency 7.6   Apply the fundamentals of CMOS design

Competency Builders:

7.6.1	Convert schematic symbols to transistors and layout correctly
7.6.2	Fabricate using CMOS process
7.6.3	Explain how a transistor works
7.6.4	Relate a transistor to CMOS cross-section shapes
7.6.5	Build cells using cell hierarchy
7.6.6	Use the layout tool to full capabilities
7.6.7	Evaluate the resistance and capacitance of layout shapes with regard to the effects on the circuit performance
7.6.8	Minimize the negative effects of resistance and capacitance
7.6.9	Design and lay out memory cells, including edge and cap cells
7.6.10	Design and lay out analog devices using circuit balancing techniques
7.6.11	Design and lay out a bit-slice device

Competency 7.7   Verify automated design

Competency Builders:

7.7.1	Use DRC
7.7.2	Use LVS
7.7.3	Layer with Boolean principles
7.7.4	Use rule file basics

Unit 8   Civil (Specialization)

Competency 8.1   Apply civil information, computation and processing skills

Competency Builders:

8.1.1   Apply AutoCAD, engineering software, coordinate geometry programs
8.1.2   Explain azimuths, angles, and bearings
8.1.3   Apply basic surveying principles and computations
8.1.4   Use basic engineering calculations
8.1.5   Read and interpret field notes
8.1.6   Create lines from coordinate points or bearings and distances

Competency 8.2   Acquire base map data information

Competency Builders:

8.2.1   Use raw survey data (e.g., field books, data collectors, and CPS data logger)
8.2.2   Use existing utility/tax map information
8.2.3   Use existing details templates
8.2.4   Use existing digital ortho photos

Competency 8.3   Set up map layout features (e.g., plan, plan and profile, and sections)

Competency Builders:

8.3.1   Use appropriate symbols
8.3.2   Use appropriate scales (vertical, horizontal)
8.3.3   Use legends along with appropriate symbols
8.3.4   Use the appropriate coordinate system

Competency 8.4   Create maps

Competency Builders:

8.4.1   Create survey map (e.g., topography, boundary)
8.4.2   Create engineering maps (e.g., preliminary plans, constructions plans)

Unit 9   GIS (specialization)

Competency 9.1   Use mapping concepts

Competency Builders:

9.1.1   Apply appropriate projection and coordinate systems
9.1.2   Apply appropriate scale and measurement systems (e.g., meters, feet, latitude and longitude)

Competency 9.2   Use GIS concepts

Competency Builders:

9.2.1   Use appropriate tools for vector data types
9.2.2   Use appropriate tools for raster data types (cell based)
9.2.3   Identify vector data types
9.2.4   Identify raster data types (cell based)

Competency 9.3   Create and use spatial data

Competency Builders:

9.3.1   Create spatial data using GIS software
9.3.2   Create spatial data from other software sources (e.g., CAD, GPS, other GIS programs)
9.3.3   Use raster data sources (photos for creating vector spatial data)

Competency 9.4   Edit spatial data

Competency Builders:

9.4.1   Edit data types using GIS and CAD software (point, line, and polygon)
9.4.2   Use error detection methods
9.4.3   Use appropriate tools for editing topologic and non-topologic data

Competency 9.5   Create tabular (attribute) data

Competency Builders:

9.5.1   Create attributes and tables
9.5.2   Add appropriate fields
9.5.3   Create tables from external data sources (e.g., SQL, Access, Oracle)

Competency 9.6   Edit tabular (attribute) data

Competency Builders:

9.6.1   Modify and manipulate fields
9.6.2   Perform field calculations
9.6.3   Join and relate data bases

Competency 9.7   Use GIS to perform queries

Competency Builders:

9.7.1   Use appropriate query tools
9.7.2   Create displays using queries

Competency 9.8   Use spatial analysis in GIS

Competency Builders:

9.8.1   Design analysis processes
9.8.2   Apply appropriate analysis tools
9.8.3   Create displays from applied analysis
9.8.4   Create finish reports from analysis results

Competency 9.9   Create presentation displays

Competency Builders:

9.9.1   Use appropriate tools for layout creation
9.9.2   Use external data sources in layout creation (CAD, Images, Graphic)
9.9.3   Efficiently produce layouts using plotting and printing devices

Competency 9.10   Use advanced GIS techniques

Competency Builders:

9.10.1   Create 3D surface models
9.10.2   Analyze 3 dimensional surface models (e.g., slope, aspect, etc.)
9.10.3   Use raster data type modeling /cell based modeling techniques (e.g., free modeling, environmental modeling)
9.10.4   Create network models (e.g., all studies, water, waste networks)

Competency 9.11   Customize GIS using programming

Competency Builders:

9.11.1   Use object oriented programming (e.g., VBA, avenue) to customize GIS
9.11.2   Identify customizing needs

Unit 10   Architectural (Specialization)

Competency 10.1   Use architectural drawing techniques

Competency Builders:

10.1.1   Use architectural drafting standards
10.1.2   Create orthographic views
10.1.3   Create sections
10.1.4   Research unknown techniques and standards
10.1.5   Make architectural details

Competency 10.2   Employ traditional drafting techniques

Competency Builders:

10.2.1   Make free-hand, multi-view, and isometric dimensioned sketches
10.2.2   Free-hand letter in a style and quality appropriate to the architectural environment
10.2.3   Use drafting tools required in the architectural environment
10.2.4   Create drawings using the various architectural scales
10.2.5   Create orthographic/multi-view drawings
10.2.6   Project information from one view to the next

10.2.7	Employ line conversions and weights that comply with the latest architectural standards
10.2.8	Operate a blue line machine
10.2.9	Identify different types of sections
10.2.10	Draw different types of sections
10.2.11	Employ proper conventions for applying cutting plane and section lines

Competency 10.3   Employ computer-aided drafting Techniques

Competency Builders:

10.3.1	Set up orthographic and isometric drawings
10.3.2	Construct orthographic and isometric drawings
10.3.3	Dimension orthographic drawings
10.3.4	Print orthographic and isometric drawings
10.3.5	Use blocks and their attributes to place symbol and objects in drawings
10.3.6	Use paper space and model space to set up drawing and printing environments

Competency 10.4   Read and interpret architectural Drawings

Competency Builders:

10.4.1	Negotiate architectural drawing sets
10.4.2	Organize drawing sets
10.4.3	Relate drawing sets to different disciplines (electrical, mechanical, etc.)
10.4.4	Translate free-hand drawings to CAD

Competency 10.5   Acquire and use architectural data Sheets

Competency Builders:

10.5.1	Read and interpret architectural data sheets
10.5.2	Apply information from architectural data sheets to drawings

Competency 10.6   Create lists of data

Competency Builders:

10.6.1   Create meaningful lists of data
10.6.2   Create easily understandable lists of data
10.6.3   Apply lists of data to architectural drawings

Competency 10.7   Read and interpret architectural Specifications

Competency Builders:

10.7.1   Read and interpret architectural specifications
10.7.2   Recognize organization of architectural specifications with regard to various disciplines
10.7.3   Read architectural specifications
10.7.4   Apply information to drawings

ACAP: Engineering Design Graphics~~

Employability Competencies

UNITS

Unit 1:   **Career Development**

Unit 2:   **Decision Making and Problem Solving**

Unit 3:   **Work Ethic**

Unit 4:   **Job-Seeking Skills**

Unit 5:   **Job Retention and Career Advancement Skills**

Unit 6:   **Technology in the Workplace**

Unit 7:   **Lifelong Learning**

Unit 8:   **Economic Education**

Unit 9:   **Balancing Work and Family**

Unit 10:   **Citizenship in the Workplace**

Unit 11:   **Leadership**

Unit 12:   **Entrepreneurship**

Unit 1　　　　　　　Career Development

Competency 1.1　　　　Investigate career options

Competency Builders:

1.1.1 Determine interests and aptitudes
1.1.2 Identify career options
1.1.3 Research interests, knowledge, abilities, and skills needed in an occupation
1.1.4 Select careers that best match interests and aptitudes
1.1.5 Identify advantages and disadvantages of career options, including self-employment and nontraditional careers

Competency 1.2　　　　Utilize career information

Competency Builders:

1.2.1 Identify a range of career information resources
1.2.2 Use a range of resources to obtain career information (e.g., handbooks, career materials, labor market information, and computerized career-information delivery systems)
1.2.3 Demonstrate knowledge of various classification systems that categorize occupations and industries (e.g., *Dictionary of Occupational Titles*)
1.2.4 Describe the educational requirements of various occupations
1.2.5 Identify individuals in selected occupations as possible information resources, role models, or mentors
1.2.6 Describe the impact of factors such as population, climate, employment trends, and geographic location on occupational opportunities
1.2.7 Assess differences in the wages, benefits, annual incomes, cost of living, and job opportunities associated with selected career options
1.2.8 Determine labor market projections for selected career options

Competency 1.3　　　　Participate in a career exploration activity

Competency Builders:

1.3.1 Identify career exploration activities (e.g., job shadowing, mentoring, volunteer experiences, part-time employment, and cooperative education)

1.3.2 Compare traits, skills, and characteristics required for specific career choices with individual's traits, skills, and characteristics
1.3.3 Recognize potential conflicts between personal characteristics and career choice areas
1.3.4 Describe the impact of exploration activities on current choices

Competency 1.4   **Assess the relationship between educational achievement and career planning**

Competency Builders:

1.4.1 Describe how skills developed in academic and vocational programs relate to career goals
1.4.2 Describe how education relates to the selection of a college major, further training, and/or entry into the job market
1.4.3 Identify skills that can apply to a variety of occupational requirements
1.4.4 Explain the importance of possessing learning skills in the workplace

Competency 1.5   **Develop an individual career plan**

Competency Builders:

1.5.1 Identify career goal(s)
1.5.2 Identify worker conditions, education, training, and employment opportunities related to selected career goal(s)
1.5.3 Describe school and community resources available to help achieve career goal(s)
1.5.4 Identify career ladders possible within selected career goal(s)*
1.5.5 Identify additional experiences needed to move up identified career ladders*
1.5.6 Recognize that changes may require retraining and upgrading of employees' skills

Competency 1.6   **Annually review/revise the individual career plan**

Competency Builders:

1.6.1 Identify experiences that have reinforced selection of the specific career goal(s) listed on the individual career plan
1.6.2 Identify experiences that have changed the specific career goals(s) listed on the individual career plan
1.6.3 Modify the career goal(s) and educational plans on the individual career plan

1.6.4   Ensure that parents or guardians provide input into the
        individual career plan process
1.6.5 Identify the correlation between the individual career plan and the
        actual courses to be taken in high school
1.6.6 Identify the correlation between the individual career plan and
        post-secondary training, adult education, or employment

Unit 2   Decision Making and Problem Solving

Competency 2.1   Apply decision-making techniques in the workplace

Competency Builders:

2.1.1 Identify the decision to be made
2.1.2 Compare alternatives
2.1.3 Determine the consequences of each alternative
2.1.4 Make decisions based on values and goals
2.1.5 Evaluate the decision made

Competency 2.2   Apply problem-solving techniques in the workplace

Competency Builders:

2.2.1 Diagnose the problem, its urgency, and its causes
2.2.2 Identify alternatives and their consequences in relation to the
        problem
2.2.3 Recognize multicultural and nonsexist dimensions of problem
        solving
2.2.4 Explore possible solutions to the problem using a variety of
        resources
2.2.5 Compare/contrast the advantages and disadvantages of each
        solution
2.2.6 Determine appropriate action
2.2.7 Implement action
2.2.8 Evaluate results of action implemented

Unit 3   Work Ethic

Competency 3.1   **Evaluate the relationship of self-esteem to work ethic**

Competency Builders:

3.1.1 Identify special characteristics and abilities in self and others
3.1.2 Identify internal and external factors that affect self-esteem
3.1.3 Identify how individual characteristics relate to achieving personal, social, educational, and career goals
3.1.4 Identify the relationship between personal behavior and self-concept

Competency 3.2   **Analyze the relationship of personal values and goals to work ethic both in and out of the workplace**

Competency Builders:

3.2.1 Distinguish between values and goals
3.2.2 Determine the importance of values and goals
3.2.3 Evaluate how one's values affect one's goals
3.2.4 Identify own short- and long-term goals
3.2.5 Prioritize own short- and long-term goals
3.2.6 Identify how one's values are reflected in one's work ethic
3.2.7 Identify how interactions in the workplace affect one's work ethic
3.2.8 Identify how life changes affect one's work ethic

Competency 3.3   **Demonstrate work ethic**

Competency Builders:

3.3.1 Examine factors that influence work ethic
3.3.2 Display initiative
3.3.3 Demonstrate dependable attendance and punctuality
3.3.4 Demonstrate organizational skills
3.3.5 Adhere to schedules and deadlines
3.3.6 Demonstrate a willingness to learn
3.3.7 Demonstrate a willingness to accept feedback and evaluation
3.3.8 Demonstrate interpersonal skills required for working with and for others
3.3.9 Describe appropriate employer-employee interactions for various situations
3.3.10   Express feelings and ideas in an appropriate manner for the workplace

Competency 3.4   Demonstrate safety skills

Competency Builders:

3.4.1 Practice safe work habits
3.4.2 Identify safety hazards
3.4.3 Employ preventative safety measures
3.4.4 Demonstrate appropriate care and use of equipment and facilities
    to ensure safety
3.4.5 Comply with safety and emergency procedures

Unit 4   Job-Seeking Skills

Competency 4.1   Prepare for employment

Competency Builders:

4.1.1 Identify traditional and nontraditional employment sources
4.1.2 Utilize employment sources
4.1.3 Research job opportunities, including nontraditional careers
4.1.4 Interpret equal employment opportunity laws
4.1.5 Explain the critical importance of personal appearance, hygiene,
    and demeanor throughout the employment process
4.1.6 Prepare for generic employment tests and those specific to an
    occupation/organization

Competency 4.2   Develop a resume

Competency Builders:

4.2.1 Identify personal strengths and weaknesses
4.2.2 List skills and/or abilities, career objective(s), accomplishments,
    educational background, work experience, volunteer/community
    contributions, and organizational memberships
4.2.3 Select an acceptable resume format
4.2.4 Use correct grammar and spelling and concise wording
4.2.5 Secure references
4.2.6 Complete the resume

Competency 4.3   Complete the job application process

Competency Builders;

4.3.1 Explain the importance of an application form
4.3.2 Obtain job application forms
4.3.3 Demonstrate behaviors (e.g., personal appearance, hygiene, and demeanor) for obtaining job application forms in person
4.3.4 Describe methods for handling illegal questions on job application forms
4.3.5 Demonstrate legible written communication skills using correct grammar and spelling and concise wording
4.3.6 Return application to appropriate person
4.3.7 Request interview
4.3.8 Follow up on application status

Competency 4.4   Demonstrate interviewing skills

Competency Builders:

4.4.1 Investigate interview procedures
4.4.2 Demonstrate appropriate behaviors (e.g., appearance, hygiene, and demeanor) for the interview
4.4.3 Demonstrate question-and-answer techniques
4.4.4 Demonstrate methods for handling difficult and/or illegal interview questions
4.4.5 Use correct grammar and concise wording

Competency 4.5   Secure employment

Competency Builders:

4.5.1 Identify present and future employment opportunities within an occupation/organization
4.5.2 Research the organization/company
4.5.3 Use follow-up techniques to enhance employment potential
4.5.4 Evaluate job offer(s)
4.5.5 Respond to job offer(s)

Unit 5   Job Retention and Career Advancement Skills

Competency 5.1   **Analyze the organizational structure of the workplace**

Competency Builders:

5.1.1 Identify employer expectations regarding job performance, work
      habits, attitudes, personal appearance, and hygiene
5.1.2 Comply with company policies and procedures
5.1.3 Examine the role/relationship between employee and employer
5.1.4 Recognize opportunities for advancement and reasons for
      termination
5.1.5 Recognize the organization's ethics

Competency 5.2   **Maintain positive relations with others**

Competency Builders:

5.2.1 Exhibit appropriate work habits and attitudes
5.2.2 Identify behaviors for establishing successful working relationships
5.2.3 Cooperate through teamwork and group participation
5.2.4 Demonstrate a willingness to compromise
5.2.5 Identify methods for dealing with harassment, bias, and
      discrimination based on race, color, national origin, gender,
      religion, disability, or age
5.2.6 Cooperate with authority
5.2.7 Accept supervision

Competency 5.3   **Demonstrate accepted social and work behaviors**

Competency Builders:

5.3.1 Demonstrate a positive attitude
5.3.2 Demonstrate accepted conversation skills
5.3.3 Use good manners
5.3.4 Accept responsibility for assigned tasks
5.3.5 Demonstrate personal hygiene
5.3.6 Demonstrate knowledge of a position
5.3.7 Perform quality work

Competency 5.4   **Analyze opportunities for personal and career growth***

Competency Builders:

5.4.1 Demonstrate opportunities within chosen occupation/organization*
5.4.2 Determine other career opportunities outside chosen occupation/organization*
5.4.3 Evaluate the factors involved in considering a new position within or outside an occupation/organization*
5.4.4 Exhibit characteristics needed for advancement*

Unit 6   Technology in the Workplace

Competency 6.1   **Demonstrate knowledge of technology issues**

Competency Builders:

6.1.1 Demonstrate knowledge of the characteristics of technology
6.1.2 Demonstrate knowledge of how technology systems are applied
6.1.3 Assess the impact of technology on the individual, society, and environment
6.1.4 Demonstrate knowledge of the evolution of technology
6.1.5 Identify how people, information, tools and machine, energy, capital, physical space, and time influence the selection and use of technology
6.1.6 Identify legal and ethical issues related to technology (e.g., confidentiality, information sharing, copyright protection)

Competency 6.2   **Demonstrate skills related to technology issues**

Competency Builders:

6.2.1 Exhibit willingness to adapt to technological change
6.2.2 Utilize technological systems
6.2.3 Utilize a variety of resources and processes to solve technological problems
6.2.4 Employ higher-order thinking skills for solving technological problems
6.2.5 Work as a team member in solving technological problems

6.2.6 Use technology in a safe and responsible manner

6.2.7 Apply science, mathematics, communication, and social studies concepts to solve technological problems

6.2.8 Demonstrate ingenuity and creativity in the use of technology*

6.2.9 Utilize a formal method (systems approach) in solving technological problems*

Unit 7   Lifelong Learning

Competency 7.1   Apply lifelong learning practices to individual situations

Competency Builders:

7.1.1 Define lifelong learning

7.1.2 Identify factors that cause the need for lifelong learning

7.1.3 Identify changes that may require the retraining and upgrading of employee's skills

7.1.4 Identify avenues for lifelong learning

7.1.5 Participate in lifelong learning activities

Competency 7.2   Adapt to change

Competency Builders:

7.2.1 Analyze the causes and effect of change

7.2.2 Identify the effect of change on goals

7.2.3 Identify the importance of flexibility when reevaluating goals

7.2.4 Evaluate the need for lifelong learning experiences in adapting to change

Unit 8   Economic Education

Competency 8.1   Analyze how an economy functions as a whole

Competency Builders:

8.1.1 Describe how individuals and societies make choices to satisfy needs and wants with limited resources

8.1.2 Identify how production factors (land, labor, capital, and entrepreneurship) are used to produce goods and services

8.1.3 Illustrate how individuals and households exchange their resources for the income they use to buy goods and services

8.1.4 Explain how individuals and business firms use resources to produce goods and services to generate income

8.1.5 Identify characteristics of command, market, and traditional economics*

8.1.6 Describe how all levels of government assess taxes in order to provide services

Competency 8.2   **Analyze how an economic system is a framework within which decisions are made by individuals and groups**

Competency Builders:

8.2.1 List several individuals and groups that make economic decisions at the local, state, and national levels

8.2.2 Identify the important roles that local, state, and national governments play in a market economy

8.2.3 List examples of how government decisions affect individuals

8.2.4 Identify how geographic locations affect the political and economic systems of the world

8.2.5 Evaluate how markets allocate goods and services

8.2.6 Explain how resources, goods, and services are exchanged in markets

8.2.7 Explain competition and its effect on the market

Competency 8.3   **Analyze the importance of making informed personal financial decisions**

Competency Builders:

8.3.1 Describe the need for personal management records

8.3.2 Create a personal budget

8.3.3 Create a budget for a family of four for one month

8.3.4 Explain how credit affects personal/family finances

8.3.5 Identify steps to avoid credit problems

8.3.6 Make informed consumer choices in response to personal needs and wants

8.3.7 Identify factors that influence consumer decisions (e.g., advertisements, peer groups, price, and location)

8.3.8 Explain the cost and benefits for individuals of various types of taxation at the local, state, and federal levels

Unit 9   Balancing Work and Family

Competency 9.1   Analyze the effects of family on work

Competency Builders:

9.1.1 Recognize how family values, goals, and priorities are reflected in the workplace
9.1.2 Identify present and future family structures and responsibilities
9.1.3 Describe personal and family roles
9.1.4 Analyze concerns of working parent(s)
9.1.5 Examine how family responsibilities can conflict with work
9.1.6 Identify ways to resolve family-related conflicts
9.1.7 Explain how to use support systems/community resources to help resolve family-related conflicts

Competency 9.2   Analyze the effects of work on family

Competency Builders:

9.2.1 Identify responsibilities associated with paid and nonpaid work
9.2.2 Compare the advantages and disadvantages of multiple incomes
9.2.3 Explain how work can conflict with family responsibilities
9.2.4 Explain how work-related stress can affect families
9.2.5 Identify family support systems and resources

Unit 10   Citizenship in the Workplace

Competency 10.1   Exercise the rights and responsibilities of citizenship in the workplace

Competency Builders:

10.1.1 Identify the basic rights and responsibilities of citizenship in the workplace
10.1.2 Identify situations in which compromise is necessary
10.1.3 Examine how individuals from various backgrounds contribute to the workplace
10.1.4 Demonstrate initiative to facilitate cooperation
10.1.5 Give/receive constructive criticism to enhance cooperation

**Competency 10.2   Prepare to work in a multicultural
                        society**

Competency Builders:

10.2.1 Identify ways to live in a multicultural society with mutual
        respect and appreciation for others
10.2.2 Examine how culture and experience create differences in people
10.2.3 Demonstrate respect for the contributions made by all people
10.2.4 Investigate personal cultural background as a means of
        developing self-respect
10.2.5 Make personal choices that reduce discrimination, isolation, and
        prejudice
10.2.6 Work effectively with people irrespective of their race, gender,
        religion, ethnicity, disability, age, or cultural background

Unit 11   Leadership

**Competency 11.1   Evaluate leadership styles appropriate for the
                        workplace**

Competency Builders:

11.1.1 Identify characteristics of effective leaders
11.1.2 Compare leadership styles
11.1.3 Demonstrate effective delegation skills
11.1.4 Investigate empowerment concepts
11.1.5 Identify opportunities to lead in the workplace

Competency 11.2   Demonstrate effective teamwork skills

Competency Builders:

11.2.1 Identify the characteristics of a valuable team member
11.2.2 Identify methods of involving each team member
11.2.3 Contribute to team efficiency and success
11.2.4 Determine ways to motivate team members

Competency 11.3   Utilize effective communication skills

Competency Builders:

11.3.1 Identify the importance of listening
11.3.2 Demonstrate effective listening skills
11.3.3 Demonstrate assertive communication techniques
11.3.4 Recognize the importance of verbal and nonverbal cues and
        messages
11.3.5 Prepare written material
11.3.6 Analyze written material
11.3.7 Give-receive feedback
11.3.8 Communicate thoughts
11.3.9 Use appropriate language
11.3.10 Follow oral and written instructions
11.3.11 Demonstrate effective telephone techniques
11.3.12 Identify technology in communications

Unit 12   Entrepreneurship

Competency 12.1   Evaluate the role of small business

Competency Builders:

12.1.1 Identify the impact of small business on local economy
12.1.2 Examine the relationship of small business to a national (USA)
        and global economy
12.1.3 Identify factors that contribute to the success of small business
12.1.4 Identify factors that contribute to the failure of small business
12.1.5 Identify the components of a business plan

**Competency 12.2   Examine entrepreneurship as a personal
                         career option**

Competency Builders:

12.2.1 Evaluate personal interests and skills
12.2.2 Compare personal interests and skills with those necessary for
        entrepreneurship
12.2.3 Determine motives for becoming an entrepreneur
12.2.4 Identify the advantages and disadvantages of owning a small
        business
12.2.5 Compare business ownership to working for others

Engineering Design Graphics

ACT Work Keys Skill Levels

Skill Area Level and Rank	Entry Level	Performance
1) Reading for Information	5	6
2) Locating Information	6	6
3) Applied Mathematics	6	6-7

Levels of Work Keys Defined

The skills needed to achieve each level for these three Work Keys*
academic skills are as follows.

Applied Mathematics

Applied Mathematics measures skill in applying mathematical reasoning
to work-related problems. There are five levels of complexity, 3 through
7, with Level 3 being the least complex and Level 7 the most complex.
The levels build on each other, each incorporating the skills at the
preceding levels.

Level 3

*Perform basic mathematical operations (addition, subtraction,
multiplication, and division) and conversions from one form to another,
using whole numbers, fractions, decimals, or percentages.
*Translate simple verbal problems into mathematical equations.
*Directly apply logical information provided to solve problems, including
those with measurements and dollars and cents.

Level 4

*Perform one or two mathematical operations (such as addition,
subtraction, or multiplication) on several positive or negative numbers.
(Division of negative numbers is not covered until Level 5.)
*Add commonly known fractions, decimals, or percentages (e.g., ½, .75,
25%) or add three fractions that share a common denominator.
*Calculate averages, simple ratios, proportions, and rates, using whole
numbers and decimals.
*Reorder verbal information before performing calculations.
*Read simple charts or graphs to obtain information needed to solve a
problem.

Level 5

*Look up and calculate single-step conversions within English or non-
English measurement systems (e.g., converting ounces to pounds or
centimeters to meters) or between measurement systems (e.g., converting
centimeters to inches).
*Make calculations using mixed unit (e.g., hours and minutes).
*Determine what information, calculations, and unit conversions are
needed to find a solution.

Level 6

*Set up problems and do several steps of calculations or conversions.
*Calculate using negative numbers, fractions, ratios, percentages, or mixed numbers (e.g., 12 1/8).
*Transpose a formula before calculating (e.g., 8X = 20 => X = 20/8).
*Look up and use two formulas to change from one unit to another unit within the same system of measurement (e.g., 1 cup = 8 fl oz, 1 quart = 4 cups).
*Find mistakes in calculations, such as those required in lower levels.
*Determine the best deal and perform a further calculation with the result.

Level 7

*Solve problems requiring multiple steps of logic and calculation.
*Solve problems involving more than one unknown, nonlinear functions (e.g., rate of change), and applications of basic statistical concepts (e.g., error of measurement).
*Locate errors in multiple-step calculations.
*Solve problems with unusual content or format, or with incomplete or implicit information

Locating Information

Locating Information measures skill in using information taken from workplace graphics such as diagrams, blueprints, floor plans, tables, forms, graphs, charts, and instrument gauges. There are four levels of complexity, 3 through 6, with Level 3 being the least complex and Level 6 the most complex. The levels build on each other, each incorporating the skills at the preceding levels.

Level 3

*Find one or two pieces of information in elementary workplace graphics, such as simple order forms, bar graphs, tables, flowcharts, and floor plans.
*Fill in one or two pieces of information that are missing from elementary workplace graphics.

Level 4

*Find several pieces of information in these type of graphics.

*Summarize and/or compare information and trends in a single graphic.
*Summarize and/or compare information and trends among more than one workplace graphic, such as a bar chart and a table showing related information.

Level 5

*Summarize and/or compare information and trends in single graphic.
*Summarize and/or compare information and trends among more than one graphic, such as a bar chart and a table showing related information.

Level 6

*Make decisions, draw conclusions, and/or apply information to new situations using several related and complex workplace graphics that contain a great amount of information or have challenging presentations (e.g., very detailed graphs, charts, tables, forms, maps, blueprints, diagrams).

Reading for Information

Reading for Information measures skill in reading and understanding work-related reading materials. There are five levels of complexity, 3 through 7, with Level 3 being the least complex and Level 7 the most complex. Although Level 3 is the least complex, it still represents a level of reading skill well above "no skill at all." The levels build on each other, each incorporating the skills at the preceding levels.

Level 3

*Identify uncomplicated key concepts and simple details.
*Recognize the proper placement of a step in a sequence of events, or the proper time to perform a task.
*Identify the meaning of works that are defined with in a passage.
*Identify the meaning of simple words that are not defined within a passage.
*Recognize the application of instructions, from a passage to situations that are described in the passage.

Level 4

*Identify details that are more subtle than those in Level 3.
*Recognize the application of more complex instructions, some of which involve several steps, to described situations.
*Recognize cause-effect relationships.

Level 5

*Understand the paraphrased definition of specialized words or phrases (jargon or technical terms) defined in these reading materials
*Use jargon or technical terms appropriately in describing situations stated in these reading materials
*Understand the meaning of acronyms defined in these reading materials (an acronym is a work or collection of letters which stands for a longer phrase, such as HMO to mean Health Maintenance Organization).
*Figure out which definition of a word with multiple meanings is appropriate in the context of these reading materials.
**Apply information given in these reading materials to situations that are not directly described, but similar.
**Apply instructions or procedures with a number of steps to described situations. These instructions may include conditional (if X happens, then you should do Y).

Level 6

*Recognize the application of jargon or technical terms to new situations.
*Recognize the application of complex instructions to new situations.
*Recognize the less-common meaning of a word with multiple meanings from context.
*Generalize from a passage to situations not described in the passage.
*Identify implied details.
*Explain the rationale behind a procedure, policy, or communication.
*Generalize from a passage to a somewhat similar situation.

Level 7

*Recognize the definitions of difficult, uncommon jargon or technical terms from context.
*Generalize from a passage to situations neither described in nor completely similar to those in a passage.

WorkKeys Process Overview

Developed by American College Testing (ACT), the purpose of the Job Profiling process is to identify the level of applied academic skills that, according to business and industry, students must master to qualify for and be successful in their occupation of choice. The results of Job Profile "leveling" can help teachers to better target instruction toward their students' needs.

The WorkKeys assessment component, developed by ACT, measures students' applied academic skills in Applied Mathematics, Reading for Information, Locating Information, Listening, Writing, Teamwork, and Observation. Each WorkKeys assessment is further broken down into four to five levels of achievement, with higher numbers indicating higher achievement in the assessed skill. For each academic skill, the Job Profiling process identifies the level required for successful entry into an occupational area.

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