Readers' Guide to Essential Skills Profiles

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Introduction

1. The Essential Skills

Essential Skills are the skills people use to carry out a wide variety of everyday life and work tasks.

Essential Skills are not the technical skills required by particular occupations but rather the skills applied in all occupations. For example, writing skills are required in a broad range of occupations. The complexity and frequency of writing varies, of course. Some workers fill out simple forms every day, while others write daily or monthly reports.

Essential Skills enable people to do their work. For example, repair persons may have to read and understand written work orders before they can do the repairs.

Essential Skills are **enabling skills** that:

1. Help people perform the tasks required by their occupation and other activities of daily life.

2. Provide people with a foundation to learn other skills.

3. Enhance people's ability to adapt to change.

The descriptions of Essential Skills in this database cover the full range of skill usage, from basic to complex.

The essential skills included here are:

- Reading Text
- Document Use
- Writing
- Numeracy
- Oral Communication
- Thinking Skills
    - Problem Solving
    - Decision Making
    - Critical Thinking
    - Job Task Planning and Organizing
    - Significant Use of Memory
    - Finding Information
- Working with Others
- Computer Use
- Continuous Learning

People who have the essential skills at the levels required for their desired occupations will have enhanced employability. However, there are other factors that also enhance employability. For example, the Conference Board of Canada's *Employability Skills Profile* also includes items such as honesty, persistence and a positive attitude to change. Higher skilled occupations, of course, also require a variety of technical skills.

2. The Essential Skills Profiles

Essential Skills Profiles describe the frequency and complexity of the use of essential skills in different occupational groups. There are:

1. Essential Skills Profiles for approximately 150 entry-level occupational groups from Skill Levels C and D of the *National Occupational Classification* (NOC). These Profiles cover all occupations that can be entered with a high school diploma or less. Most are based on information from open-format interviews with 3,000 workers across Canada. Some are part of National Occupational Standards developed by the private sector with assistance from Human Resources and Skills Development Canada.
2. Essential Skills Profiles for occupations requiring study beyond high school. These Profiles are part of National Occupational Standards developed by the private sector, or National Occupational Analyses conducted in the Red Seal program for apprenticeable trades. Additional profiles will be added as they become available.

An Essential Skills Profile describes how each essential skill is actually used by workers in an occupational group. For each essential skill, a Profile generally contains:

- Complexity ratings that indicate the level of difficulty of the tasks related to that skill.

- Examples that illustrate how that skill is actually used.

- A standardized description of how that skill is used so readers may make comparisons between occupations or aggregate information across occupations.

3. Using The Essential Skills Profiles

The Profiles may be useful to a wide variety of people:

- Course and curriculum developers who are creating educational programs and activities at various levels of education.
- Trainers and teachers working with youth and adults.
- Guidance and career counsellors providing advice on career options and educational routes.
- Employers who are selecting or developing appropriate training for employees.
- Parents, mentors and advisors helping students plan for their future.
- Learners who wish to better understand occupational requirements.
- Occupational and workplace researchers who are studying employment in Canada.

The Essential Skills Profiles have many potential uses. They could be used, for example, to:

- Develop workplace Essential Skills Training Programs.
- Develop tasks that could be incorporated in classroom activities at various levels of education.
- Create educational tools to enhance essential skills development.
- Provide a framework for Essential Skills Needs Assessments in particular workplaces.
- Determine an appropriate co-op placement for a student.

4. Understanding The Essential Skills Profiles

Each Essential Skills Profile uses the same format, to make information easy to find. Readers will find the same headers in each profile, the same ordering of the essential skills, and data that is presented in a consistent manner.

Every Essential Skills Profile includes the following sections in the same order:

Title
Introduction
A. Reading Text
B. Document Use
C. Writing
D. Numeracy
E. Oral Communication
F. Thinking Skills

1. Problem Solving
2. Decision Making
3. Critical Thinking
4. Job Task Planning and Organization
5. Significant Use of Memory
6. Finding Information

G. Working with Others
H. Computer Use
I. Continuous Learning
J. Other Information

Every Profile also uses standardized terms to describe the essential skills and standardized concepts to measure their use.

4.1 Title

Purpose of the Title: The Title indicates the occupational group described in the Profile.

Types of Titles:

> a) For Profiles that are based on interviews with workers: the Title is the name of an occupational group in the National Occupational Classification - either a Unit or Minor Group and its NOC number.

> b) For Profiles that are part of an occupational standard: the Title is the name of the occupational standard. The NOC number refers to the group in the National Occupational Classification to which the standard relates.

4.2 Introduction

Purpose of the Introduction: The Introduction is designed to provide readers with a quick overview of the occupational group and its most important essential skills.

Description of the occupational group: The Introduction begins with a description of the occupational group covered by the Profile. This description is taken from the lead statement of the NOC group or groups to which the Profile relates.

List of the most important essential skills: Each Profile provides information on all the essential skills and how they are used within that occupational group. However, these skills are not all of equal importance within an occupational group. Therefore, all Profile Introductions have a statement identifying the most important essential skills for that occupational group. The purpose of this section is to introduce the reader immediately to those essential skills that are *the most important, i.e., the most defining* for the Profile.

For readers whose work includes assessing occupational training needs and priorities, or reaching conclusions about which occupations have skills in common, knowledge about the most important essential skills for an occupation will help provide a greater understanding of the relative weighting of skills within the occupational group.

4.3 Essential Skill Sections

4.3.1 Complexity Rating

Definition of "Complexity Rating": Many essential skills have been given two types of ratings for complexity - a) the range of complexity of typical tasks for the occupation, and b) the range of complexity of the most complex tasks for the occupation.

1. **Typical -** a task which is "typical" occurs frequently in the job or occurs less frequently, but nevertheless is required by virtually all incumbents.

2. **Most Complex -** a task considered "most complex" was identified as such by the workers interviewed. Factors affecting whether a worker identified a task as "most complex" include the difficulty of the task, how frequently the task is performed and the worker's familiarity with the task.

It is possible for a task to be both typical and complex, i.e., the task may be normally (typically) associated with the occupation and yet complex because of its nature.

Complexity ratings for both "typical" and "most complex" tasks are usually given as ranges.

A further explanation with regard to "most complex" tasks: It is important to note that not all jobs in an occupational group will involve the same range of complexity. Rather, the range of complexity reported for "most complex" tasks includes all the tasks reported by interviewees as their "most complex." Not all jobs within the occupational group will include tasks at the highest level of complexity reported.

The rating given for the most complex tasks is a range because not all jobs in an occupational group require the same level of complexity. For example, the profile might indicate that the most complex tasks range from Complexity Levels 2 to 4. This indicates that all jobs in the occupational group were found to involve tasks at Complexity Level 2 and some jobs, but not necessarily all, involve tasks at Level 4. Both pieces of information are useful. While trainers might set Level 4 as a target for training, individuals with Level 2 skills could adequately perform some jobs in the occupational group.

4.3.2 Examples

Definition of an "Example": An Example task is one that is generally performed by **most workers** in an occupational group. Each essential skill includes a list of Examples to illustrate the use of that skill. While the Examples are not a comprehensive listing of the duties performed in that occupational group, they do provide a picture of the nature and range of tasks performed.

Sub-sets within occupational groups: Some occupational groups have sub-sets of workers who perform different tasks. When this occurs, the Examples are divided accordingly. For example, in the Profile on "Pursers and Flight Attendants", some Examples may refer only to pursers, while others refer only to flight attendants. The Examples section would then contain these two sub-headings, each with its own set of examples. Where there is a variety of jobs within one NOC occupational group, there may be three or four occupational sub-headings, each with its own Examples.

The qualifier – "may": Some Examples use the qualifier "may". This indicates that the task does not relate to all workers. For example, the statement "animal care workers may read veterinary medicine reference books", means that some, but not all, animal care workers read these reference books.

Modifiers of frequency: Some tasks are followed by a modifier, placed within brackets, indicating the frequency of the task. For example, the modifier (daily) refers to a task performed routinely, at least once a day. Other references are (weekly), (monthly), (frequently), (occasionally) and (rarely). Modifiers of frequency are only used when data showed a strong indication of frequency. Therefore, not all tasks are modified in this way.

4.3.3 The Summary Section

Purpose of the Summary Section: There is, within the description of most essential skills, a Summary Section designed to describe, in a standardized way, how the skill is used in the occupational group. While the Examples provide a picture of how the skill is used within the occupational group, readers would not be able to use this information for comparative purposes. The description provided by the Summary Section is both more comprehensive and more easily comparable. The use of standardized categories allows the reader to compare between occupational groups or to aggregate information across occupational groups, if desired.

Essential Skills with Summary Sections: The following essential skills have a Summary Section within their description:

> A. Reading - Reading Summary
> B. Document Use - Document Use Summary
> C. Writing - Writing Summary
> D. Numeracy - Math Skills Summary
> E. Oral Communication - Oral Communication Summary
> G. Working with Others - Participation in Supervisory or Leadership Activities
> H. Computer Use - Computer Use Summary
> I. Continuous Learning - How Learning Occurs

Readers should note that *F. Thinking Skills* and *J. Other Information* do not have Summary Sections.

Use of Symbols:

1. In Essential Skills Profiles that are based on interviews with workers, symbols are used to indicate the proportion of interviews in which a particular skill element was reported.

   > > > indicates most of the interviews
   > > indicates some of the interviews
   > indicates few of the interviews

   Readers should note that the symbols used do not refer to frequency of use, but rather to the percentage of interviews in which an item was reported. That means, for instance, that a task done rarely by everyone is scored high, while a task done frequently by a specialized group is scored low.

2. In Essential Skills Profiles developed as part of an occupational standard, these symbols are not used. Rather, those skill elements that apply to the occupational group are marked with a Ö.

5. Using this Guide

This *Introduction* to the *Readers' Guide* discusses the general elements, terms and symbols found throughout the Essential Skills Profiles.

The following pages look in more detail at how each of the Essential Skills is described in a Profile.

For each Essential Skill, there is:

a) an overview that generally includes a definition of the skill and a summary of the kinds of information provided; and

b) detailed explanations of the headings, terms and measurement scales used in the description of that Essential Skill.

For elements, terms and symbols that are found throughout the Profiles, readers will be referred back to this *Introduction* for explanations.

A. Reading Text

Section Overview

Reading Text refers to reading material that is in the form of sentences or paragraphs.

Reading Text generally involves reading notes, letters, memos, manuals, specifications, regulations, books, reports or journals.

Reading Text includes:

- forms and labels if they contain *at least one paragraph*
- print and non-print media (for example, texts on computer screens and microfiche)
- paragraph-length text in charts, tables and graphs

The **Reading Text** section of the Profile has four main components.

1. Complexity Rating

2. Examples

3. Reading Summary

4. Other Information

1. Complexity Rating

The information on Complexity Rating is presented in table format at the beginning of the Reading Text section in each Essential Skills Profile.

The **five levels** of the text-reading complexity scale are compatible with those used in the International Adult Literacy Survey (IALS), except that IALS Level 4 has been broken down into Levels 4 and 5.

For a more detailed discussion of complexity ratings in the Essential Skills Profiles, please refer to *4.3.1 Complexity Rating* in the *Introduction.*

LEVEL 1

Read relatively short texts to locate a single piece of information.

Follow simple written directions.

Electrologists read directions on bottles of sterilant.

Pet groomers read items in supply catalogues and purchasing flyers.

Riggers read brief notices about changes in regulations or load restrictions.

LEVEL 2

Read more complex texts to locate a single piece of information or read simpler texts to locate multiple pieces of information.

Make low-level inferences.

> *Kitchen helpers* read safety precautions relating to fire hazards in the kitchen.

> *Bartenders* read recipes for mixed drinks from a variety of bartenders' guides.

> *Security guards* read security incident reports left by the preceding shift.

LEVEL 3

Choose and integrate information from various sources or from several parts of a single text.

Make low-level inferences from multiple sources.

Identify relevant and irrelevant information.

> *Painters and sanders* refer to manuals on sandblasting and painting procedures to gain information on how to deal with surfaces of differing porosity and hardness.

> *Branch managers* may refer to several human resource manuals to locate and integrate information on topics such as pay scales and job descriptions.

> *Police dispatchers* read computerized incident reports and relate them to memos and directives from other law enforcement agencies

LEVEL 4

Integrate and synthesize information from multiple sources or from complex and lengthy texts.

Make complex inferences and use general background knowledge.

Evaluate quality of text.

> *Court clerks* select information from various Acts to assist Justices of the Peace in cases where clarity of jurisprudence is required. The Acts contain complex legal terminology.

> *Track maintainers* read various sections and subsections of the "Equipment Inspection Processes" regulations to determine repair situations in which crews must stop trains.

> *Animal care workers* may read veterinary medicine reference books to locate and compare information on urinalysis and cytology.

LEVEL 5

Interpret dense and complex texts.

Make high-level inferences and use specialized knowledge.

> *Materials testing managers* read specifications, approximately 25 pages in length, for rarely used testing procedures. They interpret the application of the standard to specific cases, making high-level inferences as to how the information applies to specific cases.

> *Assistant business managers* in labour unions read adjudication decisions that have established jurisprudence for pending grievances which are to go to adjudication. The legal wording has specific and complex implications for specific cases.

2. Examples

This section contains a **list** of Examples of the text-reading tasks done by workers in the occupational group. This is not a complete list. Rather, it provides a "picture" of the nature and range of text-reading tasks performed within the occupational group.

Each example is followed by a number that indicates its level of complexity.

For a more detailed discussion of examples in the Essential Skills Profiles, please refer to *4.3.2. Examples* in the *Introduction*.

3. Reading Summary

The Reading Summary describes, in a standardized way, all of the text reading performed by workers in the occupational group. The information is presented in a **table** that matches *types of text* with *purposes for reading.*

Types of text

Forms - with at least one paragraph of text*

- a completed job application outlining the applicant's work experience
- a completed purchasing form

*Use of **Forms** that involves reading less than one paragraph of text can be found in *B. Document Use.*

Labels - with at least one paragraph of text*

- Workplace Hazardous Materials Information System (WHMIS) labels
- directions on a bottle of hair dye

*Use of **Labels** that involves reading less than one paragraph of text can be found in *B. Document Use.*

Notes, Letters, Memos

- reminder notes from colleagues
- shift change-over notes
- letters to and from customers
- memos from supervisors
- detailed work orders

Manuals, Specifications, Regulations

- service and computer manuals
- training manuals
- company operating procedures and policies
- product design specifications and specifications on blueprints
- health and safety regulations
- codes such as the electrical and building codes

Reports, Books, Journals

- incident reports
- productivity reports
- reference books relating to job specialty, e.g., veterinary medicine reference book for animal care workers
- professional or technical journals relating to job specialty, e.g., gardening journals for landscaping labourers

Purpose for Reading

To scan for specific information.

To locate information.

Finding specific information in the text by glancing over the text and using standard locative features such as the table of contents, index and glossary.

Workers scan memos to find meeting locations.

To skim for overall meaning.

To get the gist.

Occurs when a reader "glances" through the text for its main features including headings, subheadings, highlighted words, diagrams, tables, etc.

Clerks skim files to determine if they have been classified under proper headings.

To read the whole text to understand and to learn.

Careful and meticulous reading of a text in its entirety with no effort to focus on only limited sections as occurs when scanning and skimming. The focus is on learning complete details of the subject matter in order to respond to a wide variety of needs.

Tow truck dispatchers read information provided for each type of vehicle listed in the towing procedures manual in order to inform new drivers of special towing requirements of different vehicles.

To read the full text to critique or to evaluate.

Occurs when a text is read with a critical eye in order to exercise judgement.

Branch managers read job descriptions to determine whether they are accurate, well worded and comprehensive.

The symbol **>** appears in the Reading Profile. For a detailed discussion of this symbol, please refer to *Use of Symbols* in *4.3.3. The Summary Section* in the *Introduction*.

4. Other Information

In this section, readers will find information about reading in languages other than the job incumbent's first official language if that task is a job requirement. Translators, for example, are required **as part of the job** to read in more than one language.

B. Document Use

Section Overview

Document Use refers to tasks that involve a variety of information displays in which words, numbers, icons and other visual characteristics (eg., line, colour, shape) are given meaning by their spatial arrangement. For example, graphs, lists, tables, blueprints, schematics, drawings, signs and labels are documents used in the world of work.

If a document includes a paragraph of text such as on a label or a completed form, it is also included in *A. Reading Text*. Documents requiring the entry of words, phrases, sentences and paragraphs are also included in *C. Writing*.

Document Use includes:

- print and non-print media (for example, computer screen or microfiche documents, equipment gauges, clocks and flags)
- reading/interpreting and writing/completing/producing of documents-these two uses of

  documents often occur simultaneously as part of the same task, e.g., completing a form, checking off items on a list of tasks, plotting information on a graph, and entering information on an activity schedule.

The **Document Use** section of the Profile has three major components.

1. Complexity Rating

2. Examples

3. Document Use Summary

1. Complexity Rating

The information on Complexity Rating is presented in table format at the beginning of the Document Use section in each Essential Skills Profile.

The Document Use complexity rating scale applies to the interpretation of documents and the entry of information in documents. It does not apply to the creation of documents (eg., drawing architectural plans). Examples involving the creation of documents are included but are not coded.

There are **five levels** of complexity based on **three dimensions** of document use:

- the complexity of the document(s) (i.e., complexity attributable to the structure of the document, number of documents and document type);

- the complexity of finding/entering information (i.e., complexity attributable to the information search and information entry); and

- the complexity of information use (i.e., complexity attributable to the content knowledge prerequisites and thinking process).

Each level of the scale is defined with reference to all three dimensions. Tasks that are more difficult on one dimension of the complexity rating scale may be more or less difficult on the others as the three dimensions function somewhat independently. For example, the "complexity of the document(s)" may fit in Level 3 while both the "complexity of finding/entering information" and the "complexity of information use" fit in Level 2. The complexity rating assigned to the task is the best summary description of its level of complexity.

The levels of the document use complexity scale are compatible with those used in the International Adult Literacy Survey (IALS), except that IALS Level 4 has been broken down into our Levels 4 and 5.

For a more detailed discussion of complexity ratings in the Essential Skills Profiles, please refer to *4.3.1 Complexity Rating* in the *Introduction.*

Dimension	Level 1	Level 2	Level 3	Level 4	Level 5
Complexity of the Document (s)	Document is very simple. Brief text combined with uncomplicated structure. E.g., simple signs, labels, lists. One document and one document type.	Document is simple. Multiple pieces of information. E.g., simple tables (i.e., small amount of information, no subparts). One document or multiple documents of the same type.	Document is somewhat complex. Multiple pieces of information organized in sections with sub-headings or subparts. E.g., complex tables. **Or** May be multiple simple documents which may include more than one document type (e.g., pie chart and bar graph). May be specialized *document types* (i.e., familiarity with the document type is required for interpre-tation). E.g., Pareto charts, isometric drawings, Gantt charts.	Document is complex. Multiple pieces of information organized in multiple sections with one additional component, such as colour coding, scale, perspective and symbols. E.g., complex paint charts, floor plans. **Or** Multiple documents and multiple types. Specialized *document types* (i.e., familiarity with the document type is required for interpreta-tion). E.g., Pareto charts, isometric drawings, Gantt charts.	Document is complex. Multiple pieces of information organized in multiple sections with two or more additional components, such as colour coding, scale, perspective and symbols. E.g., intricate aerial maps, isometric drawings. **Or** Multiple documents and multiple types. Specialized *document types* (i.e., familiarity with the document type is required for interpreta-tion). E.g., Pareto charts, isometric drawings, Gantt charts.

Dimension	Level 1	Level 2	Level 3	Level 4	Level 5
Complexity of Finding/ Entering Information	**Information Search** **Limited search** **using key words, numbers, icons or other visual characte-ristics** **(e.g., line, colour, shape) to locate information.** **Information Entry** **Entering few pieces of information.** **Thinking Process** **Minimal inference is required. Information found or entered in**	**Information Search** **Locating one or more pieces of information using:** **one or two search criteria (e.g., using menu headings to find vegetarian choices); Or** **consecutive searches with the same one or two search criteria (e.g., using a phone list to find phone numbers for several people).** **Entering several pieces of information.** **Thinking**	**Information Search** **Locating one or more pieces of information using:** **multiple search criteria, Or** **the *results* of one search in a subsequent search (e.g., finding the chemical composition of paint from its label and then using that information to search Material Safety Data Sheets).** **Information Entry** **Entering multiple pieces of information.**	**Information Search** **Locating multiple pieces of information using:** **multiple search criteria which may have to be developed by the user, Or** **the *results* of one search in a subsequent search.** **Information Entry** **Entering multiple pieces of information.** **Thinking Process**	**Information Search** **Locating multiple pieces of information using:** **-multiple search criteria which may have to be developed by the user; Or** -the *results* of one search in a subsequent search, possibly based on criteria developed by the user. **Information Entry** **Entering multiple pieces of information.** **Thinking Process**

Dimension	Level 1	Level 2	Level 3	Level 4	Level 5
	the document is a literal match (i.e., identical) to the information required. Information needed is immediate and obvious.	Process A low level of inference is required. Information found or entered in the document(s) is a synonymous match (i.e., obviously related) to the information required. Information needed is fairly evident.	Thinking Process A moderate degree of inference is required. The match between the information found or entered in the document(s) and the information required may be ambiguous.	Considera-ble inference may be required. Match between the information found or entered in the document(s) and the information required is ambiguous. One or more distractors may hinder the process of finding and/or entering the correct informa-tion. The information needed may be mentally restructu-red into categories devised by the user.	A high level of inference is required. The match between the information found or entered in the document(s) and the information required is ambiguous. Multiple distractors may hinder the process of finding and/or entering the correct informa-tion. The information needed is mentally restructu-red into categories devised by the user.

Dimension	Level 1	Level 2	Level 3	Level 4	Level 5
Complexity of Information Use	No knowledge of the content (i.e., substance) of the document is required to use the information. No analysis required. - Information is used in the form it is found. - Information is entered in the form it is found.	Limited knowledge of the content (i.e., substance) of the document may be required to use the information. Limited analysis required. - Information found in the document(s) may be rearranged to make simple comparisons. E.g., preparing a list of the top ten sales representatives each month to compare performance. - Information available may be rearranged for entry onto the document. E.g., rearrange alphabetically listed contacts into a listing by province.	Some knowledge of the content (i.e., substance) of the document is required to use the information. Some analysis required involving selection and integration of information. - Information found in the document(s) must be integrated. E.g., integrate information from two diagrams in a repair manual to troubleshoot the problem. - Information must be combined for entry	Specialized knowledge of the content (i.e., substance) of the document may be required. Multiple pieces of information from multiple sources are synthesized. The quality of information may be evaluated for accuracy and omissions. - Information found in the document(s) is synthesized and possibly evaluated. E.g., weather forecasting using data synthesized from many sources and evaluated as	Specialized knowledge of the content (i.e., substance) of the document is required. Information is evaluated to make judgements of quality based on criteria and/or to draw conclusions. E.g., critique research data to note methodological flaws.

Dimension	Level 1	Level 2	Level 3	Level 4	Level 5
			onto the document. E.g., completing a monthly quality control form by integrating information from several production lines.	to its accuracy. - Information must be synthesized for entry onto the document. E.g., preparing tax returns using data from many sources.	

Examples for Complexity Levels for Document Use

LEVEL 1

Bylaw enforcement officers read lists of subpoenas and Court dates.

Truck drivers fill in drivers' checklists, verifying the safety of various parts of the truck.

Deck crews identify flags, such as the Bravo flag, which means that explosives are being unloaded.

Railway track maintenance workers may read computer printouts showing the actual and the required grade levels for various tracks.

Automotive mechanical installers and servicers identify Workplace Hazardous Materials Information System (WHMIS) icons.

LEVEL 2

Image, social and other personal consultants may read manufacturers' size charts to match measurements with sizes.

Estheticians, electrologists and workers in related occupations may read equipment catalogues when purchasing new equipment.

Visiting homemakers, housekeepers and workers in related occupations read work schedules and assignment sheets to determine work locations, times and duties.

Septic tank cleaners use scale drawings to determine the location of septic tanks on residential properties.

Workers in dry cleaning, laundry and finishing occupations read colour codes to determine the correct amount of chemicals needed to remove stains.

Truck drivers read fuel tables indicating fuel consumption over a certain number of kilometers.

LEVEL 3

Computer operators interpret troubleshooting charts and diagnostic tables in computer manuals.

Motor vehicle assemblers, inspectors and testers refer to graphs to compare the number of rejects from week to week.

Optometrist assistants use diagrams to identify the angles for inserting and removing contact lenses.

Boat operators read tide tables to know whether the tide is ebbing or rising and to determine the depth of tide waters at particular times.

Rubber processing machine operators read schematic drawings when repairing, assembling or maintaining machines.

LEVEL 4

Forging machine operators interpret isometric drawings to bend metal according to the customers' specifications and blueprints to set up the machine for the required tolerances.

Golf club general managers interpret scale drawings such as blueprints, golf course plans, topographical maps, architectural drawings and drawings showing drainage and irrigation.

Inspectors and testers, mineral and metal processing, read production information presented in tables in order to convert the information to a graphic format.

Water and waste plant operators synthesize data from multiple forms, tables, charts and graphs in analysing the performance of control systems and equipment to diagnose and correct problems, such as leaking pipes.

Heritage interpreters read archival documents such as forms that may be old, cryptic and difficult to understand.

LEVEL 5

Silviculture workers refer to different types of maps including forest cover maps, aerial maps, contour maps, road maps, landscape maps, guide and trapper maps, and maps showing houses of and areas belonging to native groups as well as forestry manuals. They synthesize the information from these documents when developing silviculture planting plans.

Blasting supervisors inspect sites and read highway construction blueprints and specifications, technical manuals, explosives products specifications and environmental regulations to complete layouts for blasting patterns. Each situation is unique.

Meteorologists analyze and synthesize information on numerous variables obtained from many document types in order to forecast weather. They analyze and synthesize information on hard-to-predict factors, a task requiring considerable specialized knowledge.

2. Examples

This section contains a **list** of Examples of the document-use tasks of workers in the occupational group. This is not a complete list. Rather, it provides a "picture" of the nature and range of document use performed within the occupational group.

This list begins with Examples that involve interpreting documents and entering information in documents. Each of these examples is assigned a complexity rating.

This may be followed by a second list of Examples that involve creating documents. These are not coded by level of complexity.

For a more detailed discussion of examples in the Essentials Skills Profiles, please refer to *4.3.2. Examples* in the *Introduction.*

3. Document Use Summary

The Document Use Summary describes, in a standardized way, all of the document use tasks performed by workers in the occupational group. The information is presented as a **list**.

There are 22 document use tasks. However, the entire list will not necessarily appear in any particular Essential Skills Profile. Only those that apply to the occupational group will be listed.

The Document Use Summary may include one or more of the following 22 tasks:

- read signs, labels or lists.
- complete forms by marking check boxes, recording numerical information or entering words, phrases, sentences or texts of a paragraph or more. The list of specific tasks varies depending on what was reported.
- read completed forms containing check boxes, numerical entries, phrases, addresses, sentences or texts of a paragraph or more. The list of specific tasks varies depending on what was reported.
- read tables, schedules and other table-like text (e.g., read work shift schedules).
- create tables, schedules and other table-like text.
- enter information on tables, schedules or other table-like text.
- plot information on graphs (e.g., line, pie, bar).
- obtain specific information from graphs or charts.
- interpret information on graphs or charts.
- construct or draw graphs or charts.
- recognize common angles such as 15°, 30°, 45° and 90°.
- draw, sketch or form common shapes such as circles, triangles, spheres, rectangles, squares, etc.
- interpret scale drawings (e.g., blueprints or maps).
- make measurements from scale drawings.
- draw to scale.
- read assembly drawings (e.g., those found in service and parts manuals).
- create assembly drawings.
- read schematic drawings (e.g., electrical schematics).
- create schematic drawings.
- make sketches.
- obtain information from sketches, pictures or icons (e.g., computer toolbars).
- interpret X-rays.

The symbol **>** appears in the Document Use Summary . For a detailed discussion of this symbol, please refer to *Use of Symbols* in *4.3.3. The Summary Section* in the *Introduction*.

Further Readings

Evetts, Julian. Document Literacy: A Guide for Workplace Educators and Instructors (1996). SkillPlan, BC Construction Industry Skills Improvement Council.

Fownes, Lynda. The Language of Documents: A Guide to Information Display in the Workplace (1999). SkillPlan, BC Construction Industry Skills Improvement Council.

These two publications are available by contacting SkillPlan at:

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C. Writing

Section Overview

Writing includes:

- writing texts and writing in documents (for example, filling in forms)
- non-paper-based writing (for example, typing on a computer)

The **Writing** section of the Profile has four main components.

1. Complexity Rating

2. Examples

3. Writing Summary

4. Other Information

1. Complexity Rating

The information on Complexity Rating is presented in table format at the beginning of the Writing section in each Essential Skills Profile.

Writing tasks are rated on a **five-level scale** of complexity. Complexity involves length and purpose; style and structure; and the content of the writing.

Please note that Levels 2 and higher refer to texts that are one paragraph or more in length or are written in a specialized literary form not employing paragraphs.

Also note that Level 2 refers to writing where the content is "routine" while Levels 3 and above are for writing with "non-routine" content. In deciding between these, coders considered whether the workers can use texts that they have written before, taking extracts or reworking them to produce the new text, or whether they have to create new ways to say new things.

For a more detailed discussion of complexity ratings in the Essential Skills Profiles, please refer to *4.3.1 Complexity Rating* in the *Introduction.*

Writing Complexity Scale					
Dimension	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**
1. Length and Purpose of the Writing	Writing that is less than a paragraph. Writing is intended to organize, remind, or inform.	Writing brief text that is a paragraph or longer intended to serve a variety of purposes.	Either longer or shorter pieces of writing intended to inform, explain, request information, express opinions or give directions.	Longer pieces of writing which present considera-ble information and which may feature a comparison or analysis. Writing task may involve making recommen-dations.	Longer pieces of writing which present an evaluation or critique, usually accompanied by recommen-dations. Writing tasks of any length which demand originality and effective-ness.
2. Style and Structure	Informal writing for small familiar audiences– usually coworkers. Writing which uses pre-set	Writing with a more formal style for an audience other than co-workers. The writing sets a tone which is	Writing task has an established format, such as a contract, lease, financial report, or job description.	Conscious organization of writing for a given purpose. Writing may require modification of an existing format, such	Appropriate tone and mood may be as important as the content. Writing may display complex, multi-part

		Writing Complexity Scale			
Dimension	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**
	formats or writing for which the format is unimportant.	appropriate for the occasion, e.g. friendly, respectful, authoritative, etc. Standard spelling and grammar (syntax) expected. Writing tasks for which templates or models exist such as memos and letters in set formats.	Writing format may call for structural elements such as headings, a table of contents, footnotes, etc.	as a proposal or a report, to fit the given information. Consideration of the audience may be an important part of the writing task at this level.	organization to accommodate varied content.
3. Content of the Writing	Concrete, day-to-day, matters of fairly immediate concern.	Content of writing is routine, with little variation from one instance to the next.	Non-routine writing tasks The content of the writing may be extensive but it is readily available from established sources.	Writing task may involve the gathering and selection of information. Abstract or technical content may demand the use of specialized vocabulary. Re-write or transform written information for a specific audience, e.g.	The content must be created or it may be synthesized using information from multiple sources.

			Writing Complexity Scale		
Dimension	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**
				rewrite technical material for a non-specialist audience.	
Examples	Written reminders to oneself. Enter short comments into communica-tions journals and log books. Write a reminder note to the operator on the next shift. Complete forms requiring only brief written entries.	Single issue letters to suppliers, customers, or agencies involved in company business. Routine memo advising superior of the budgeted purchase of new equipment. E-mailed request to foreman asking for more paint. Write letters to public library patrons about overdue books.	Non-routine memo to supervisor or other company office holder i.e. a memo to the HR Director describing a disciplinary situation. Write letter of understan-ding which touches on several issues for the caterer at a large wedding. Write article for the company newsletter covering the introduction of new computers in the accounting department.	Write several sections of gas plant operations manual covering start-up and shut-down procedures for cryogenic turbo-expanders and related equipment. Write annual operating report for combined construction materials operation with sand & gravel and.shtmlhalt divisions.	Write background documents for municipal transportation policy. Write marketing plan for national campaign. Weave historic fact into the dramatic monologue for an actor at a heritage interpretation site.

LEVEL 1

Writing that is less than a paragraph, intended to organize, remind, or inform.

Informal writing for small familiar audiences–usually coworkers.

Writing which uses pre-set formats or writing for which the format is unimportant.

Writing content is concrete, day-to-day, matters of fairly immediate concern.

Sample Tasks

- Write reminders to oneself.

- Enter short comments into communications journals and log books.

- Write a reminder note to the operator on the next shift.

- Complete forms requiring only brief written entries.

Illustrative Examples

Couriers write short notes to themselves recording changes to delivery routes.

Nurses' aides write brief entries about patient care in the card files.

Side boom operators write daily logs using single words and short phrases to describe the condition of their machines.

LEVEL 2

Brief text that is a paragraph or longer intended to serve a variety of purposes.

The writing sets a tone which is appropriate for the occasion, e.g. friendly, respectful, authoritative, etc.

Writing has a more formal style for an audience other than co-workers.

Content of writing is routine, with little variation from one instance to the next.

Sample Tasks

- Single issue letters to suppliers, customers, or agencies involved in company business.

- Routine memo advising superior of the budgeted purchase of new equipment.

- E-mailed request to foreman asking for more paint.

- Write letters to public library patrons about overdue books.

Illustrative Examples

Transformer fabricators write memos to suppliers on a weekly basis.

Computer salespersons write short letters to customers making quotes on hardware and software choices.

Ships' pursers on ferries complete accident report forms to explain collisions of vehicles on car decks.

LEVEL 3

Either longer or shorter pieces of writing intended to inform, explain, request information, express opinions or give directions.

Writing task has an established format, such as a contract, lease, financial report, or job description.

Writing format may call for structural elements such as headings, a table of contents, footnotes, etc.

The content of the writing may be extensive, but it is readily available from established sources.

Sample Tasks

- Non-routine memo to supervisor or other company office holder. For example, a memo to the HR Director describing a disciplinary situation.

- Write letter of understanding which touches on several issues for the caterer at a large wedding.

- Write article for the company newsletter covering the introduction of new computers in the accounting department.

Illustrative Examples

Fashion consultants write faxes and letters to modeling agencies and retailers informing them of new customer services.

Loan officers document records of foreclosures.

RCMP constables prepare information for search warrants.

LEVEL 4

Longer pieces of writing which present considerable information and which may feature a comparison or analysis.

Writing task may involve making recommendations.

Writing may require modification of an existing format, such as a proposal or a report, to fit the given information.

Sample Tasks

- Write several sections of gas plant operations manual covering start-up and shut-down procedures for cryogenic turbo-expanders and related equipment.

- Write annual operating report for combined construction materials operation with sand & gravel and.shtmlhalt divisions.

Illustrative Examples

Switchboard operators may write evaluations of a number of phone systems and, drawing on their experience, make recommendations to management for purchase options.

Bylaw enforcement officers write options and recommendations for proposed bylaw changes.

LEVEL 5

Writing tasks of any length which demand originality and effectiveness.

Appropriate tone and mood may be as important as the content.

The content must be created or it may be synthesized using information from multiple sources.

Writing may display complex, multi-part organization to accommodate varied content.

Creative writing.

Sample Tasks

- Write background documents for municipal transportation policy.

- Write marketing plan for national campaign.

- Weave historic fact into the dramatic monologue for an actor at a heritage interpretation site.

Illustrative Examples

Heritage Interpreters write research articles for publication in magazines.

Special Events Coordinators create marketing materials, scripts and feature articles to promote public awareness and participation.

Poets use their imagination to create original pieces of work.

2. Examples

This section contains a **list** of Examples of the writing tasks done by workers in the occupational group. This is not a complete list. Rather, it provides a "picture" of the nature and range of writing tasks performed within the occupational group.

Each example is followed by a number that indicates its level of complexity.

For a more detailed discussion of examples in the Essential Skills Profiles, please refer to *4.3.2. Examples* in the *Introduction*.

3. Writing Summary

The Writing Summary describes, in a standardized way, all of the writing performed in the occupation. The information is presented in a **table** that matches the *length of writing* with the *purposes for writing.*

Length of Writing

Texts requiring less than one paragraph of new text

- letters
- daily log entries
- reminder notes to co-workers
- brief production reports

Texts rarely requiring more than one paragraph

- memos to supervisors
- information sheets to be posted
- accident reports
- brief letters

Longer texts

- detailed procedures
- minutes of meetings
- analytical reports

Purposes for Writing

To organize.

To remember.

>   *Security guards* make brief "to do" notes as reminders of tasks to be completed later in their shifts.

To keep a record.

To document.

>   *Machine operators* record hourly and daily production for official company records.

To inform.

To request information.

>   *Early childhood education assistants* write notes to supervisors to inform them that some children will be picked up later than usual and to provide details of the situation.

To persuade.

To justify a request.

>   *Chefs* write memos to restaurant managers justifying purchases of food items not listed on weekly order forms.

To present an analysis or comparison.

>   *Telemarketers* write regular reports to supervisors to compare their success using different marketing scripts and approaches.

To present an evaluation or critique.

>   *Bus schedulers* present an evaluation of the time efficiency of various routes based on monitoring the routes over specified time periods.

To entertain.

>   *Tour operators* write brief commentaries including humorous local events in preparation for conducting guided tours.

The symbol **>** appears in the Writing Summary . For a detailed discussion of this symbol, please refer to *Use of Symbols* in *4.3.3. The Summary Section* in the *Introduction*.

4. Other Information

When appropriate, readers will find here further information about the writing skill in this occupational group such as:

- particularly stringent demands for accuracy and appropriate tone in writing because of legal implications; or

- occupational specialties that require writing in a second or third language such as references to bilingualism for translators or foreign language use for tour guides.

D. Numeracy

Section Overview

Numeracy refers to the workers' use of numbers and their being required to think in quantitative terms.

The **Numeracy** section of the Profile has three main components.

1. Complexity Rating
   - Numerical Calculation
     - Money Math
     - Scheduling or Budgeting and Accounting Math
     - Measurement and Calculation Math
     - Data Analysis Math

   - Numerical Estimation

2. Examples

3. Math Skills Summary
   1. Mathematical Foundations Used
   2. How Calculations Are Performed
   3. Measurement Instruments Used

1. Complexity Rating

The information on Complexity Rating is presented in table format at the beginning of the Numeracy section in each Essential Skills Profile.

It includes the complexity of the **numerical calculation tasks** performed in four application settings: money math; scheduling or budgeting and accounting math; measurement and calculation math; and data analysis math.

It also includes the complexity of tasks involving **numerical estimation**.

An issue regarding complexity ratings in Numeracy: There is a distinction between workers' use of numbers and their level of understanding of the underlying concepts involved. For example, a worker can take a number from a computer printout to put in a report without knowing how it was calculated. The level of difficulty of a task is determined by the math tasks performed and the background knowledge required.

The symbol **>** is used in this table. For a detailed discussion of this symbol, please refer to *Use of Symbols* in *4.3.3. The Summary Section* in the *Introduction*.

Numerical Calculation Complexity Rating Scale

The Numerical Calculation Complexity Rating Scale has **five levels** based on **two dimensions -** *Operations Required* and *Translation*.

Operations Required refers to the actual math operations used, e.g., multiplication, division. It covers the number of different operations used, the number of steps of calculation and the difficulty of the operations used.

Translation refers to turning a work problem into a set of mathematical operations so that math may be applied to obtain an answer. For example, a waiter adding up a bill does not have to do much translation to set up the problem. In contrast, a roofer uses more translation, i.e., restating the problem as a set of mathematical operations, to determine how many packages of shingles are needed to cover an irregularly shaped roof. The roofer must think through and set up the problem before doing the necessary math operations.

Tasks that are more difficult on one dimension of the complexity rating scale, e.g., Operations Required, may be more or less difficult on the other, e.g., Translation, since the two dimensions function somewhat independently . For example, the Operations Required may fit in Level 2 while the Translation fits in Level 3. The complexity rating assigned to a task is the best summary description of its level of complexity.

Complexity Level	Operations Required	Translation
Level 1	Only the simplest operations are required and the operations to be used are clearly specified. Only one type of mathematical operation is used in a task.	Only minimal translation is required to turn the task into a mathematical operation. All information required is provided.
Level 2	Only relatively simple operations are required. The specific operations to be performed may not be clearly specified. Tasks involve one or two types of mathematical operation. Few steps of calculation are required.	Some translation may be required or the numbers needed for the solution may need to be collected from several sources. Simple formulae may be used.
Level 3	Tasks may require a combination of operations or multiple applications of a single operation. Several steps of calculation are required.	Some translation is required but the problem is well defined. Combinations of formulae may be used.
Level 4	Tasks involve multiple steps of calculation.	Considerable translation is required.
Level 5	Tasks involve multiple steps of calculation. Advanced mathematical techniques may be required.	Numbers needed for calculations may need to be derived or estimated; approximations may need to be created in cases of uncertainty and ambiguity. Complex formulae, equations or functions may be used.

Examples of Complexity Levels for Numerical Calculation

Numerical calculation is rated within **four application settings**.

- *Money Math -* financial transactions, such as handling cash, preparing bills or making payments;

- *Scheduling or Budgeting and Accounting Math* - managing time and money as resources, planning and monitoring their use, assessing best value, reducing waste;

- *Measurement and Calculation Math* - measuring and describing the physical world; and

- *Data Analysis Math -* analysis of numerical data.

These settings are rated separately because there is specific knowledge of concepts or procedures exclusive to each setting. The ability to do math of a given complexity in one application setting may not mean that the worker can perform math tasks of equivalent complexity in another application setting. For example, a job may require highly complex measurement and calculation math. However, a worker who can successfully perform these tasks may not be able to perform equally complex data analysis tasks because knowledge of different concepts and procedures is required.

Following are four tables that illustrate the complexity ratings within each of the four application settings.

Table 1: Money Math		
Complexity Levels	**Sample Tasks**	**Illustrative Examples**
Level 1	Enter amounts in a cash register. Total simple bills. Make change. Receive payments.	*Chip stand operators* enter the costs of their customers' orders in cash registers, receive payments and make change. *Clam diggers* receive payments upon delivering clams and verify that the distributors' calculations are correct.
Level 2	Total accounts/bills including calculations of one of the following - a simple discount, taxes, interest, etc., or including calculations of components charged by a rate, e.g., mileage charge. Approve such bills for payment. Handle foreign currency in a cash transaction. Exchange between currencies, deducting fee. Calculate prices using a formula, e.g., cost price plus % mark up or regular price minus % mark down.	*Sewing machine technicians* calculate labour charges by multiplying their hourly rate by the number of hours required to repair each sewing machine and finding a total. *Tour directors* verify and authorize payments of invoices directly billed to the company for hotel accommodations, food, etc. This involves multiplying the number of people by the unit cost of the room or meal, calculating the applicable taxes and adding up the total.
Level 3	Total bills/accounts including calculation of two or more of the following discounts, taxes, interest, etc., or components charged by a rate, e.g., mileage charge. Approve such bills for payment. Prepare pay cheques using rates of pay, deduction schedules, bonus calculations, etc.	*Bank tellers* selling safety deposit boxes to senior citizens prorate yearly fees and apply seniors' discounts. *Ticket cargo agents* calculate cargo fares of packages that exceed the price scale by considering taxes, insurance rates and discount rates where applicable.
Level 4	Make mental calculations involving considerable	*Roulette dealers* calculate the amount of money that each

Table 1: Money Math		
Complexity Levels	**Sample Tasks**	**Illustrative Examples**
	translation with a high degree of speed and accuracy.	winner captures according to the placement of chips, the betting odds and the value assigned to the non-value and value chips. Complexity is enhanced by the high volume of calculations required, e.g., there are multiple bets for up to eight people, the quick speed of calculation and the precise accuracy required.
Level 5	Forecast prices when the critical factors must be estimated based on an analyses of past indicators and projections of future trends.	*Investment analysts* calculate future prices of stocks given current interest rates and other market factors.

Table 2: Scheduling or Budgeting and Accounting Math

Complexity Levels	Sample Tasks	Illustrative Examples
Level 1	Record costs against categories of budgets. Monitor schedules or budgets reporting overruns and surpluses. Make entries in financial records.	*Sales associates* prepare daily bank deposits and make financial entries in bank deposit forms. *Cashiers* reconcile the cash at the end of each shift and report any surpluses or shortfalls.
Level 2	Determine number of packages to buy, based on the number of units required, e.g., how many packages of 30 tiles should be purchased if 196 tiles are needed. Determine sizes of work crews required and schedule length of a specific job using established production rates per person. Prepare simple financial summaries.	*Accounting clerks* determine staffing requirements and set staffing schedules using full-time, part-time and relief staff. *Restaurant hostesses* prepare revenue counts - financial summaries of the total revenue, number of people served and average bill, and file them with food and beverage managers.
Level 3	Adjust established budgets and schedules to incorporate new information. Compare two options with differing cost structures, e.g., determine the long distance phone service with the best cost for a given phone usage pattern.	*Riggers* schedule crews and equipment at 15 minute intervals, and adjust schedules to accommodate unforeseen lifts and delays. *Maintenance and event technicians* review tenders for services and supplies worth over $150 to determine best values based on prices and quality.
Level 4	Plan and monitor schedules and budgets for small or short-term projects. Audit financial records to determine accuracy and adherence to financial procedures.	*Senior plant operators* plan for annual shutdowns that require co-ordinating work schedules for regular staff and contractors. Three months of planning is required for one week of shutdown. *Chefs* establish weekly budgets including costs for food, planning for kitchen staff requirements

Complexity Levels	Sample Tasks	Illustrative Examples
		and costs for special events.
Level 5	Determine budgets and schedules for multi-faceted or multi-phase projects. Compare long-term investment alternatives where future rates of return are not known.	*Assistant managers* in large companies develop annual budgets for each department and the overall company. *Agricultural managers* prepare master annual budgets that include discrete budgets for each division. They establish prices for products by factoring in the required profit margins.

Table 2: Scheduling or Budgeting and Accounting Math

Table 3: Measurement and Calculation Math		
Complexity Levels	**Sample Tasks**	**Illustrative Examples**
Level 1	Take measurements through a one-step process and record the results, e.g., clerk weighs mail and records the results in the mailbook. Measure out quantities, e.g., four gallons of paint. Set instruments to particular angles and other numeric settings.	*Postal workers* weigh and measure parcels to determine postal rates. *Physiotherapy aides* adjust settings on physiotherapy equipment when preparing treatment areas for incoming patients. *Labourers* measure out lengths of pipe using tape measures.
Level 2	Calculate areas and volumes of simple, familiar shapes. Convert between measurement systems or between units in one system, e.g., inches to millimetres. Calculate and weigh out or measure out quantities or volumes involving doubling, quadrupling, halving, quartering, etc. some given amount or sets of amounts.	*Child caregivers* measure ingredients when cooking and may have to double or half recipes. *Shippers* calculate the number of items on skids by counting the items in a row and multiplying by the total number of rows.
Level 3	Measure curved and irregular lengths or other dimensions. Calculate areas of shapes that are simple composites of simple, familiar shapes, e.g., composites of rectangles, or rectangles and triangles. Make scale drawings. Take precise measurements using specialized measurement equipment, e.g., depth.	*Sewing machine technicians* use special gauges to take precise measures of sewing machine components in diagnosing the cause of equipment failure. *Maintenance personnel* calculate areas of walls, taking account of windows and doors, to ensure that they obtain correct amounts of paint.
Level 4	Calculate areas and volumes of complex, irregular shapes. Calculate the numbers of units of fixed dimensions required to cover irregular areas, e.g., tiles for an irregular shaped floor or shingles for an irregular	*Welders* prepare for out-of-position welds and use trigonometric formulae to determine required angles. *Boat assemblers* measure flooring spaces to accommodate fuel tanks that must be fitted over curved

Table 3: Measurement and Calculation Math		
Complexity Levels	**Sample Tasks**	**Illustrative Examples**
	shaped roof.	bottoms and ribs, requiring precise measurements of slopes and angles.
Level 5	Make indirect measurements, e.g., using trigonometry, geometry. Devise estimates and make indirect calculations of measurements that cannot feasibly be taken directly.	*Tower crane operators* calculate weights of loads and optimal load positions for proper weight distribution by factoring in density of materials, distances from the centre of rotation of cranes to the centre of gravity of loads, and variable factors such as temperature and moisture. *Silviculturists* use trigonometry and geometry to calculate tree-to-land ratio requirements for a particular stand of trees. They use calipers to measure the tree diameters and prisms to calculate the number of trees to be cut.

Table 4: Data Analysis Math		
Complexity Levels	**Sample Tasks**	**Illustrative Examples**
Level 1	Make simple comparisons such as identifying what is higher or lower, bigger or smaller.	*Gas utility maintenance workers* determine locations of leaks by comparing variations in gas readings at different points. *Post office clerks* record transactions daily and compare the monthly volume of various kinds of transactions.
Level 2	Calculate basic summary measures, e.g., averages.	*Ferry operators* count different kinds of vehicles using the ferry and calculate monthly averages by user group. *Financial advisors* calculate average rates of return on investments to prepare financial plans for clients.
Level 3	Calculate averages across sets of readings, compare them to acceptable ranges and draw conclusions for such activities as statistical quality control and applying principles of probability.	*Dieticians* calculate average fluids consumed by patients over seven-day periods to recommend adaptations to diets. *Bolt machine operators* perform Statistical Process Control calculations and make adjustments to machines if the data are outside acceptable ranges. They also graph the data each hour.
Level 4	Determine and calculate appropriate descriptive statistics, e.g., rates. Decompose a difference in rates between two populations.	*Industrial products analysts* make comparisons of a company's performance relative to industry counterparts, using statistics drawn from financial statements as a base for comparison.
Level 5	Test hypotheses. Explore causal relationships - their strength, their significance, the effect of controls. Modeling inter-relationships of sets of variables. Make projections. Conduct	*Investment analysts* analyze the past and present performance of companies' stock to forecast future values. They must gather information on interest rates, political events and the state of local and global economies. *Assistant business managers* of

Table 4: Data Analysis Math		
Complexity Levels	Sample Tasks	Illustrative Examples
	analyses employing mathematical modeling.	unions calculate impacts of different variables on pay and benefits proposals tabled in negotiations. They project pension contribution data into the future to determine the rates of return.

Numerical Estimation Complexity Rating Scale

The **four-level rating scale** for Numerical Estimation refers to tasks involving any estimation that results in a number. The rating scale covers **five dimensions**:

- whether there is a set procedure;
- the number of factors comprising the item being estimated;
- the amount of information available;
- the consequence of error; and
- the degree of precision required.

Each level of the Numerical Estimation Scale is defined with reference to all these dimensions. Tasks which are more difficult on one dimension of the complexity rating scale may be more or less difficult on the others since the five dimensions function somewhat independently. For example, the "consequence of error" may fit in Level 2 while the "degree of precision required" fits in Level 3. The complexity rating assigned to a task is the best summary description of its level of complexity.

Dimension	Level 1	Level 2	Level 3	Level 4
Whether there is a set procedure	There is a formula. It identifies the variables and how they are to be combined.	There is a formula, but it does not incorporate all of the variables.	There is no formula, but an approach has been developed, possibly by having to perform the task repeatedly.	There is no formula and no established approach is available to the worker.
Number of factors comprising the item being estimated	One factor, e.g., estimating a dimension by eyeballing; estimating weight by lifting objects.	A small number of factors.	Many factors, but a routine has been established.	Many factors involved and the methodology for making the estimate must be developed by the worker.
Amount of information available	All information about the factors that make up the estimate and how to combine them is known. Any complicating factors are known.	Most information is known, but there are factors that could throw an estimate off.	Information about significant factors that make up the estimate is uncertain; several complications are possible but they are constrained in their impact.	Little or no information about significant factors that make up the estimate; the factors may have to be estimated. Many complications are possible and they may not be constrained in their impact.
Consequence of error	Little or no consequence of error; estimation errors can be easily and quickly	Estimation errors have some minor consequence, e.g., some loss of money or time, but can	Estimation errors have significant consequences, e.g., significant loss of money	Estimation errors have significant consequences that are not rectifiable or only

Dimension	Level 1	Level 2	Level 3	Level 4
	rectified with little or no work plan required or costs incurred.	be rectified with some minor work plan, inconvenience or cost.	or time, but can be rectified.	rectifiable at significant cost.
Degree of precision required	Little or no precision required.	Precision required within relatively wide range of values.	Precision required within a small range of values	High degree of precision required.

Examples of Complexity Levels for Numerical Estimation

LEVEL 1

Dental assistants estimate the number of pre-measured amalgam capsules required for a particular cavity. There is a set procedure and minimum precision is required. Estimation errors may be quickly rectified by mixing up more amalgam on the spot.

Dry cleaners estimate weights of loads of garments by feel rather than actually weighing them.

LEVEL 2

Taxi drivers estimate the costs of fares by considering distance, rate and traffic conditions.

Salon attendants book hair appointments with salons' hair stylists. They estimate the time available for each stylist, taking into consideration the time needed for different services such as cuts, perms and colours.

LEVEL 3

Personnel clerks, in consultations with department managers, estimate staffing requirements for upcoming years by considering many factors, e.g., expected volume of work. Estimation errors impact customer service by reducing response times.

Bus schedulers estimate times for new bus routes where rider-demand from businesses along routes is unknown. Inaccurate time estimates may result in significant costs in time, money and public relations, but may be quickly rectified by issuing new schedules.

LEVEL 4

A *union business agent* representing public sector workers responds to a unique request to estimate what the union membership will be in five years by considering public policy trends and economic factors.

2. Examples

This section contains a **list** of Examples of numeracy tasks done by workers in the occupational group. This is not a complete list. Rather, it provides a "picture" of the nature and range of numeracy tasks performed within the occupational group.

The application setting and complexity level of each example is indicated.

For a more detailed discussion of examples in the Essential Skills Profiles, please refer to *4.3.2. Examples* in the *Introduction*.

3. Math Skills Summary

The Math Skills Summary describes, in a standardized way, all of the math skills used in the occupational group. It is organized in **three sections**.

1. a. Mathematical Foundations Used, i.e., what specific math skills or knowledge are used in the job?

2. b. How Calculations Are Performed, i.e., how is the worker expected to make calculations?

3. c. Measurement Instruments Used, i.e., what measurements are performed, what is used to take the measurement, and what measurement systems are used?

Mathematical Foundations Used

Mathematical Foundations Used lists specific math skills or knowledge areas. The information is presented in a **two-column format.** The **left-hand column** lists standardized titles of knowledge areas. Readers will find the complete list of titles below. However, the entire list will not necessarily appear in a particular Essential Skills Profile. Only those that apply to the occupational group will be listed.

The symbol **>** appears in Mathematical Foundations Used. For a detailed discussion of this symbol, please refer to *Use of Symbols* in *4.3.3. The Summary Section* in the *Introduction*.

The **right-hand column** gives more detail about the math skills used by workers in each knowledge area, and provides an example that illustrates more fully the use of that knowledge area in the occupational group.

Both the categories of math skills on the left and the specific math skills on the right use standard wording to allow for comparison between occupations and aggregation across occupations. Examples or definitions appearing in brackets are not part of the standard wording that appears in the profiles. Rather, they are included to provide additional explanation.

Mathematical Foundations Used may include one or more of the following 15 specific math skills or knowledge areas:

Number Concepts	
Whole Numbers **(e.g., 1, 2, 3)**	read and write, count, round off, add or subtract, multiply or divide whole numbers.
Integers **(e.g., -2, -1, 0, 1, 2)**	read and write, add or subtract, multiply or divide integers.
Rational Numbers - Fractions **(e.g., 1/2, 5/8)**	read and write, add or subtract fractions, multiply or divide by a fraction, multiply or divide fractions.
Rational Numbers - Decimals **(e.g., 8.50, .75)**	read and write, round off, add or subtract decimals, multiply or divide by a decimal, multiply or divide decimals. Use decimals mainly to refer to dollars and cents.
Rational Numbers - Percents **(e.g., 10%, 45%)**	read and write percents, calculate the percent one number is of another, calculate a percent of a number.
Equivalent Rational Numbers **(e.g., 1/2 = 0.5 = 50%)**	convert between fractions and decimals or percentages, convert between decimals and percentages.
Other Real Numbers **(e.g., Ö2, p)**	use powers and roots, scientific notation, significant digits.

Patterns and Relations	
Equations and Formulae	solve problems by constructing and solving equations with one unknown; use formulae by inserting quantities for variables and solving; write, simplify and solve two variable algebraic problems; write, simplify and solve quadratic equations.
Use of Rate, Ratio and Proportion	use a rate showing comparison between two quantities with different units (e.g., amount of medication to administer per 10 kg of body weight), use a ratio showing comparison between two quantities with the same units (e.g., gas to oil mix in parts 16:1), use a proportion showing comparison between two ratios or rates in order to solve problems (e.g., 4 gallons of gasoline requires 40 oz. of oil - how much oil would be needed for 3 gallons? 4:40 = 3:x).
See *Document Use* for information on: **- using scale drawings.**	

Shape and Spatial Sense	
Measurement Conversions	perform measurement conversions (e.g., converting from one measurement to another such as from imperial to metric; converting from one unit of measurement to another such as from inches to feet).
Areas, Perimeters, Volumes	calculate areas, calculate perimeters, calculate volumes.
Geometry	use geometry (e.g., deducing the properties, measurements and relationships of points, lines, angles and figures. Includes concepts such as parallelism, perpendicularity and tangents).
Trigonometry	use trigonometry (e.g., using the sine, cosine, tangent, cotangent, secant and cosecant ratios to determine the size of an unknown side or angle of a triangle).
See *Document Use* for information on: **- recognizing common angles;** **- drawing, sketching and forming common forms and figures.**	

Statistics and Probability	
Summary Calculations	calculate averages, calculate rates other than percentage; calculate proportions or ratios.
Statistics and Probabilities	use statistics and probability (e.g., collecting, classifying, analyzing and interpreting data and, by using mathematical theories of probability, making conclusions about a population or about how likely it is that some event will happen).
See *Document Use* for information on: **- using tables, schedules or other table-like text;** **- using graphical presentations.**	

How Calculations Are Performed

How Calculations Are Performed describes how workers are expected to make calculations. Essential Skills Profiles do not reflect the skill level or preference of the worker, but rather the requirements of the job.

The information in this section is provided as a **list**. However, the entire list will not necessarily appear in a particular Essential Skills Profile. Only those that apply to the occupational group will be listed.

The symbol **>** appears in How Calculations Are Performed. For a detailed discussion of this symbol, please refer to *Use of Symbols* in *4.3.3. The Summary Section* in the *Introduction*.

How Calculations Are Performed may include one or more of the following 4 calculation options:

- in the worker's head.
- using pen and paper.
- using a calculator.
- using a computer.

Measurement Instruments Used

Measurement Instruments Used describes the measurements performed, the instruments used and the type of measurement systems employed by workers in the occupational group.

The information in this section is provided as a **list**. However, the entire list will not necessarily appear in a particular Essential Skills Profile. Only those that apply to the occupational group will be listed.

The Math Skills Summary will indicate the measurement instruments used for each parameter listed. For example, if a task involves measuring distances using an odometer, this will be indicated.

The symbol **>** appears in Measurement Instruments Used. For a detailed discussion of this symbol, please refer to *Use of Symbols* in *4.3.3. The Summary Section* in the *Introduction*.

Measurement Instruments Used may include one or more of the following 10 measurement parameters:

- time;
- weight or mass;
- distance or dimension;
- liquid volume;
- temperature;
- pressure;
- wattage;
- volts;
- angles;
- density.

Some occupations involve measurement of other parameters. These are noted after the standard list of measurement parameters. Information is also provided on the use of the metric measurement system and the imperial measurement system. This information is also coded with the standard set of symbols reflecting the percent of interviews in which it was reported.

E. Oral Communication

Section Overview

Oral Communication pertains primarily to the use of speech to give and exchange thoughts and information by workers in an occupational group.

The **Oral Communication** section of the Profile has six main components.

1. Complexity Rating

2. Examples

3. Oral Communication Summary

4. Modes of Communication Used

5. Environmental Factors Affecting Communication

6. Other Information

1. Complexity Rating

The information on Complexity Rating is presented in table format at the beginning of the Oral Communication section in each Essential Skills Profile.

There are **four levels** of complexity based on **four dimensions** of oral communication:

- the range and complexity of communication functions, i.e., why and how one communicates;

- the range and complexity of the information about which one communicates;

- the range and complexity of the communication context, i.e., to whom and in what circumstances one communicates; and

- the risk level in failing communication intent, i.e., how serious are the consequences if communication fails.

Each level of the Oral Communication Scale is defined with reference to all four dimensions. Tasks that are more difficult on one dimension of the complexity rating scale may be more or less difficult on the others as the four dimensions function somewhat independently. For example, the complexity of "range and complexity of information" may fit in Level 2 while the complexity of "risk levels in failing communication intent" fits in Level 3. The complexity rating assigned to a task is the best summary description of its level of complexity.

The levels of the oral communication scale have been developed to be compatible with those in **Canadian Language Benchmarks, English as a Second Language for Adults, 1996**.

The two scales relate as follows:

Canadian Language Benchmarks	
Level One	Listening / Speaking Benchmarks 5, 6
Level Two	Listening / Speaking Benchmarks 7, 8
Level Three	Listening / Speaking Benchmarks 9, 10
Level Four	Listening / Speaking Benchmarks 11, 12

For a more detailed discussion of complexity ratings in the Essential Skills Profiles, please refer to *4.3.1 Complexity Rating* in the *Introduction*.

Oral Communication Complexity Rating Scale				
Dimension	**Level 1**	**Level 2**	**Level 3**	**Level 4**
Range and complexity of communica-tion functions	Limited oral communication demands in basic work-related social interaction. Includes: responding to daily inquiries; obtaining specific information; following and giving simple instructions; simple greeting; leaving and receiving short routine recorded messages (answering machine or voice mail); attending routine meetings; co-ordinating work with one or two other individuals.	Moderate oral communication demands. Includes: exchanging information; obtaining information by questioning multiple sources; following or giving detailed multi-step instructions; greeting formally; reassuring; comforting; dealing with minor conflict or complaints; leaving and receiving complex recorded messages (answering machine, voice mail; dictaphone); presenting and discussing simple options and advising on choices; participating in routine meetings; co-ordinating work with several other individuals.	Extensive oral communication demands in complex work-related social interaction. Includes: providing, obtaining or exchanging detailed complex information and opinions; providing or following complex directions and instructions; persuading (e.g., to sell a product or service); resolving non-routine conflict; entertaining (casually or with preparation); advising/-counselling (eg. career, employment); assessing/-evaluating (eg. job performance); leading routine meetings; co-ordinating work with and for others.	Extensive oral communication demands in very complex work-related social interaction. Includes: leading or guiding; facilitating complex group problem solving and decision making; persuading; instilling understanding of complex subject matter; motivating; conducting negotiations and mediating; clinical counselling; assessment and evaluation; entertaining (with preparation).

Oral Communication Complexity Rating Scale				
Dimension	**Level 1**	**Level 2**	**Level 3**	**Level 4**
Range and complexity of information	Narrow range of subject matter, familiar topic, one main issue. Language is factual, literal, concrete; narrow range of content and context-specific or technical vocabulary. Information content is simple; limited number of details.	Moderate range of subject matter, familiar topics, usually one main issue. Language is both factual or concrete and abstract; moderate range of general and context-specific or technical vocabulary and idiom. Information content is moderately complex and detailed; deals mostly with facts but may also deal with emotions and opinions.	Significant range of subject matter; professional, organizational, theoretical, social issues. Language can be abstract and conceptual; extensive range of general and technical vocabulary and idiom. Information content is complex and detailed; deals with facts, opinions, emotions; requires ability to organize, present and interpret ideas coherently.	Wide range and depth of subject matter; inter-disciplinary information; professional, organizational, theoretical, social issues. Language can be highly abstract, conceptual and technical. Information content very complex and detailed; deals with facts, opinions, values, emotions controversy. High level of inference and ability to organize, present and interpret ideas coherently for analysis, synthesis, decision-making, evaluation.
Range and complexity of communica-tion context	Highly predictable context. Interacting with one person at a time, face to	Less predictable context. Communicating one-on-one on detailed and specific	Context can be unpredicta-ble. Interacting one-on-one on complex matters, face to	A variety of contexts; complex and shifting from unpredicta-ble to highly ritualized. Communicating

Oral Communication Complexity Rating Scale				
Dimension	**Level 1**	**Level 2**	**Level 3**	**Level 4**
	face, on a familiar matter. If communicating on the phone, the exchange follows a routine scenario. Role of the speaker is singular and clearly defined. Common situation, familiar setting and process, established format and style to provide and obtain information. Physical context may be used to support verbal communication visually (e.g., by pointing, demonstrating). Exchange is brief (10 mins or less).	matters, often on the phone or by listening to recorded information; interacting frequently with several people or one-on-one on more detailed and complex matters; giving a short talk or directions to a small group. Participants have clearly defined roles. Selecting from a moderate range of formats and styles to present information. Established rules and conventions; mostly familiar situation and setting; physical context may be used to support verbal communication visually. Audience non-challen-ging and usually co-	face, on the phone, and/or through recorded messages. Giving a presentation to or exchanging information and opinions in a group, face to face or by tele-confe-rencing; communicating one-on-one on complex matters. Selecting from a significant range of formats and styles of presentation, levels of language complexity and degrees of formality to communicate a variety of ideas. The individual may have more than one role in the group. Situation and setting may be new and unfamiliar. Audience can	one-on-one on very detailed and complex matters; leading or facilitating group discussions, negotiations, mediation, instruction; presenting to diverse groups; expressing opinions, evaluations, recommendations, demands or appeals in public; communicating one-on-one on very detailed and complex matters. Selecting and adapting or creatively using a wide range of presenta-tion formats and styles to suit purpose and audience. Situation and setting may be new and unfamiliar. Audience can be unfamiliar, unco-opera-tive, challenging or hostile to the speaker.

Oral Communication Complexity Rating Scale				
Dimension	**Level 1**	**Level 2**	**Level 3**	**Level 4**
		operative. Exchange is of brief to medium duration (10-30 mins). Physical conditions may impede communica-tion (noise).	be unfamiliar, include authority figures and occasionally unco-opera-tive or hostile. Exchange can be of medium to extended duration (30 mins or more). There may be**significant** noise or other interference.	Exchange can be of extended duration (an hour or more). Physical conditions may **seriously** impede oral communication.
Risk levels in failing communication intent	Low resulting in: unsuccess-ful interaction where any particular failure is of minor significance; minor inefficiency; temporary confusion of the listener; or discomfort or embarrass-ment of the speaker.	Moderate resulting in: unsuccessful interaction where each particular failure is significant; loss of some money or time; minor hazard; or one-on-one hostility that can be fairly easily terminated.	Significant resulting in: failure to obtain a major objective; danger, significant hazard; public hostility, criticism or discredi-tation; or loss of considerable money and time.	Critical resulting in: loss of life or serious injury; very significant or serious personal consequences or consequences to the speaker's organization.

Examples of Complexity Levels for Oral Communication

LEVEL 1

Cashiers greet customers, tell them the total of their bill and respond to their questions about products and hours of operation.

Security guards exchange information with incoming staff during the shift change and talk to members of the public when providing access to the building or grounds.

Photographic and film processors interact with customers to take orders and talk with suppliers to order supplies and to check back orders.

LEVEL 2

Accounting and related clerks speak with customers to follow up on overdue accounts, negotiate payments and discuss disagreements.

Dental assistants talk to patients to make them comfortable, instruct them about oral hygiene, explain procedures and calm them when they are experiencing discomfort.

Maîtres d'hôtel and hosts or hostesses provide feedback to servers, resolve disagreements with clients and participate in staff meetings to discuss quality issues.

LEVEL 3

Quality control technicians in the apparel industry interact with operators to correct work that does not meet quality standards and to persuade them to make changes. At times this involves dealing with hostile reactions.

Sign pre-production technicians interact with customers to analyse their requirements, establish objectives and negotiate agreements. They also make presentations to small groups, such as representatives of a potential client company.

Collectors speak to debtors to explain their amounts owing and determine a plan of action. Debtors may be upset or hostile during this interaction.

LEVEL 4

Business owner operators may make presentations to large industry groups to promote their business. They may also chair formal meetings during networking sessions hosted by local trade or business organizations.

Negotiators and mediators mediate to resolve conflict and produce agreements between individuals, groups, organizations or countries.

2. Examples

This section contains a **list** of Examples of oral communication tasks done by workers in the occupational group. This is not a complete list. Rather, it provides a "picture" of the nature and range of oral communication tasks performed within the occupational group.

Each example is followed by a number that indicates its level of complexity.

For a more detailed discussion of examples in the Essential Skills Profiles, please refer to *4.3.2. Examples* in the *Introduction*.

3. Oral Communication Summary

The Oral Communication Summary describes, in a standardized way, all of the oral communication performed in the occupational group. The Oral Communication Summary is presented in a **table** that matches ***types of oral communication*** and the ***purposes for oral communication***.

The symbol **>** appears in the Oral Communication Summary . For a detailed discussion of this symbol, please refer to *Use of Symbols* in *4.3.3. The Summary Section* in the *Introduction*.

Types of Oral Communication

- Listen with little or no interaction, e.g. listening to a loud speaker or voice mail.
- Speak with little or no interaction, e.g. making announcements, leaving voice messages.
- Interact, i.e., both listening and speaking with co-workers. Note: "co-workers" refers to fellow employees with whom no supervisory relationship exists.
- Interact with those the worker supervises or directs.
- Interact with supervisors/managers.
- Interact with customers/clients/public.
- Interact with suppliers and servicers.
- Participate in group discussions.
- Present information to small groups, i.e., less than 10.
- Present information to large groups, i.e., 10 or more.

Purposes for Oral Communication

To greet.

> The formal function of greeting visitors/clients including the activities performed at a reception desk. This function does not include greeting of co-workers.

> A *library clerk* is often the first person a library user meets. The tone of this interaction can encourage or discourage a new library user and helps to mitigate complaints.

To take messages.

> *General office clerks* take messages and relay essential information, by phone or in person, to other workers.

To provide information/explanation/direction.

To receive information/explanation/direction.

> *Cashiers* exchange information with co-workers about specials, shortages and customer requests.

> *Glass bevellers* direct and observe as helpers guide large pieces of glass through cutters. Helpers must respond instantly to instructions, turning off the machine if they spot cracks or nicks to prevent breakage and injury.

To seek information.

To obtain information.

Situations in which the worker has to pose questions.

> *Pharmacy assistants* question customers about drug allergies and about other medications they may be taking that are not recorded.

To co-ordinate work with that of others.

> *Refuse collectors* co-ordinate routes with other drivers. A street missed in garbage pick-up results in complaints and backtracking to rectify the mistake.

To reassure.

To comfort.

> *Amusement ride operators* reassure parents that their children are safe on rides provided appropriate restraint devices are used.

To discuss, e.g., exchange information/opinions.

> *Process operators* meet quarterly to discuss planning and production with a team of up to 12 workers.

To persuade.

> *Pharmacy assistants* persuade customers to choose appropriate products such as children's vitamins and non-prescription drugs that are compatible with medications that customers are already taking.

To facilitate.

To animate.

> Lead or guide a group in conversation or discussion.

> *Tour and travel guides* lead discussions among tour participants on subjects relevant to particular sites such as history or geography.

To instruct.

To instill understanding and knowledge.

> Experienced workers instruct less experienced workers by teaching practical skills and technical knowledge.

> *Journeyperson glaziers* instruct unskilled workers who are in apprenticeship training. *Nursery workers* instruct helpers showing them where and when to water, especially when they are new to the job.

To negotiate.

To resolve conflicts.

> Does not refer only to formal negotiations, such as contract negotiations between labour and management, but to all interaction involving negotiation.

> *Bailiffs* responsible for seizing assets negotiate with debtors to find alternate arrangements for repaying debts.

To entertain.

> *Boat owners/operators* interact with passengers making friendly conversation, providing information and acting as hosts before and during cruises.

4. Modes of Communication Used

Modes of Communication Used describes, in a standardized way, all of the media used by workers in the occupational group when communicating. The information is presented as a **list**.

There are four modes of communication. However, the entire list will not necessarily appear in a particular Essential Skills Profile. Only those that apply to the occupational group will be listed.

The Modes of Communication Used may include one or more of the following 4 media:

- in person, e.g., workers in close proximity to each other speak face to face.
- using a telephone, e.g., workers responsible for materials place orders by phone.
- using a two-way radio or other such means, e.g., dispatchers use two-way radios to direct taxi drivers to the next destination.
- using specialized communication signals, e.g., workers in high noise level environments use hand signals to signal safety concerns or changes in operation.

The symbol **>** appears in the Modes of Communication Used. For a detailed discussion of this symbol, please refer to *Use of Symbols* in *4.3.3. The Summary Section* in the *Introduction*.

5. Environmental Factors Affecting Communication

This section, presented as a **paragraph**, refers to factors that impact oral communication in the work environment and how workers adapt to such factors. This includes noise levels that impede oral communication or necessitate quick, concise communication during moments when noise is reduced.

> *Sawmill production workers* wear hearing protection at all times because of high noise levels. Oral communication is limited to a short time at the beginning of the shift and break times.

> *Highway construction workers* must deal with noise from machines and distances between work stations when communicating with one another.

6. Other Information

In this section, readers will find information about oral communication in languages other than the job incumbent's first official language if that task is a job requirement. Interpreters, for example, are required **as part of the job** to listen and speak in more than one language.

F. Thinking Skills

Section Overview

Thinking Skills differentiates between six different types of cognitive functions. However, these functions are interconnected.

The **Thinking Skills** section of the Profile has six components.

Application 1. Problem Solving

Problem solving involves problems that require solutions. For example, a mechanic solves problems, e.g., the car shakes when driven over 80 km./hr., by eliminating probable causes until the correct one is identified and remedied. Most problems concern mechanical challenges, people or situations.

The **Problem solving** section of the Profile has two components.

1. Complexity Rating

2. Examples

1. Complexity Rating - Problem Solving

The information on Complexity Rating is presented in table format at the beginning of the Problem Solving section in each Essential Skills Profile.

There are **four levels** of complexity based on **four dimensions** of problem solving:

- the complexity of the problem;
- the complexity of identifying the problem;
- the complexity of identifying the solution steps; and
- the complexity of assessing the solution.

Each level of the Problem Solving Scale is defined with reference to all four dimensions. Tasks that are more difficult on one dimension of the complexity rating scale may be more or less difficult on the others as the four dimensions function somewhat independently. For example, the complexity of "identifying the problem" may fit in Level 2 while the complexity of "assessing the solution" fits in Level 3. The complexity rating assigned to a task is the best summary description of its level of complexity.

Problem Solving Complexity Rating Scale				
Dimension	**Level 1**	**Level 2**	**Level 3**	**Level 4**
Complexity of the problem	Limited number of factors.	Broad range of factors, most of which are clearly defined.	Broad range of factors, some of which may be vague or ambiguous.	Unpredictable and contradictory factors play a role.
Complexity of identifying the problem	All appropriate information is provided to solver.	Procedures are provided for determining the nature of the problem.	Solver must determine what procedures are to be used to identify the nature of the problem.	Solver must create procedures to identify the nature of the problem.
Complexity of identifying the solution steps	Procedures are given for matching a solution to the problem, once it has been identified.	Solver has to determine which of several available solutions are most appropriate.	May have to modify existing procedures for solving the problems to meet new needs.	Solver must create procedures for solving the problem.
Complexity of assessing the solution	Check that problem has been solved.	Assess efficiency and effectiveness of solution that was used.	Assess efficiency and effectiveness of solution that was used and identify changes needed.	Solver must identify or create criteria for assessing effectiveness of the solution.

Examples of Complexity Levels for Problem Solving

LEVEL 1

Word processing clerks check diagnostic schematics when photocopiers stop working to identify the nature of problems and their location.

Refuse collectors encounter a problem when a filled garbage can is too heavy. The can is left filled, and a call is made to the office with the address and reason for leaving the can, so office staff can answer the complaint if the customer calls.

LEVEL 2

When a customer can only pay with foreign currency and does not agree with the store's listed rate of exchange, the *cashier* has several options but must solve the problem quickly in order to serve the next customer in line.

Casting operators use tractors to tow loads of hot molten metal. Hooking-up to trailers in tight spaces may require operators to maneuver vehicles by pushing the wheels or approaching from the opposite direction.

LEVEL 3

Septic tank cleaners deal with problems such as sewage backing up. Although a problem solving model is available, cleaners deal constantly with unknown factors because the tanks are underground, a variety of pumps are used, and soil conditions are difficult to determine.

Boat owner/operators can lose considerable revenue on pre-booked cruises when unexpected operator illness occurs. A broad range of details including food preparations, crew assignments and customer contacts must be considered when finding a replacement, postponing or canceling.

LEVEL 4

Typesetter/graphic designers must make one client's job look different from others. This problem is further complicated by time pressure, changes or additions that can significantly change the layout, and materials developed with unfamiliar computer programs.

Sea kayak guides face medical emergencies from time to time. They assess injuries, plan evacuation or administer treatment and, at the same time, are responsible for the rest of the customer group.

2. Examples - Problem Solving

This section contains a **list** of Examples of the problem solving tasks done by workers in the occupational group. This is not a complete list. Rather, it provides a "picture" of the nature and range of problem solving tasks performed within the occupational group.

Each example is followed by a number that indicates its level of complexity.

For a more detailed discussion of examples in the Essential Skills Profiles, please refer to *4.3.2. Examples* in the *Introduction*.

Application 2. Decision Making

Decision making refers to making a choice among options.

Decision making occurs during problem solving, but not all decision making is part of problem solving. It is, therefore, presented as a separate thinking skill. For example, buyers for retail outlets regularly make decisions about which suppliers to buy from, i.e., they select among the options for particular types of merchandise. This is not problem solving.

The **Decision making** section of the Profile has two components.

1. Complexity Rating

2. 2. Examples

1. Complexity Rating - Decision Making

The information on Complexity Rating is presented in table format at the beginning of the Decision Making section in each Essential Skills Profile.

There are **four levels** of complexity based on **six dimensions** of decision making:

- the consequence of error;
- the reversibility of the decision;
- the adequacy of the information available;
- whether there is a set procedure or decision tree to follow;
- whether there is a body of similar, past decisions to compare to; and
- the extent to which judgement is required to make an appropriate decision.

Each level of the Decision Making Scale is defined with reference to all four dimensions. Tasks that are more difficult on one dimension of the complexity rating scale may be more or less difficult on the others as the four dimensions function somewhat independently. For example, the complexity of "consequence of error" may fit in Level 2 while the complexity of "adequacy of information" fits in Level 3. The complexity rating assigned to a task is the best summary description of its level of complexity.

Decision Making Complexity Rating Scale				
Dimension	**Level 1**	**Level 2**	**Level 3**	**Level 4**
Consequence of error	Little or no consequence of error.	Errors have some minor consequence, e.g., some loss of money or time, but can be rectified with some minor work plan, inconvenience or cost.	Errors have significant consequences, e.g., significant loss of money or time, but can be rectified.	Errors have significant consequences that are not rectifiable or are only rectifiable at significant cost.
Reversibility of the decision	Decision easily reversed.	Decision can be reversed with some inconvenience or difficulty; decision is reversible but options are reduced.	Decision can be reversed with significant difficulty.	Decision cannot be reversed, or it can be reversed only with major (legal, financial, health) consequences.
Adequacy of the information available	All information relevant to the decision is known.	Most information relevant to the decision is known.	Information about significant elements relevant to the decision is uncertain.	Significant information relevant to the decision is not known.
Whether there is a set procedure or decision tree to follow	There is a set procedure or decision tree to follow, any bases for exceptions are clearly specified.	There is a set procedure or decision tree to follow but there are also grounds for exception that require some discretion or interpretation.	There is a set procedure but it provides significant scope for discretion or interpretation.	There is no set procedure or decision tree.
Whether there is a body of similar, past	There are similar past decisions that are	There are similar past decisions but some	There are past decisions but they provide limited	No comparable past decisions on which to

Decision Making Complexity Rating Scale				
Dimension	Level 1	Level 2	Level 3	Level 4
decisions to compare to	directly applicable and that are available to the decision maker.	extrapolation or analysis is required to apply them to the present decision.	guidance only due to their small number or their limited comparability to the present decision.	base the present decision
The extent to which judgement is required to make an appropriate decision	Limited or no judgement needed to make an appropriate decision.	Need to consider several well-defined factors to make an appropriate decision in cases where the consequence of error is low. May involve using technical knowledge.	Need to consider many factors in order to make an appropriate decision. These factors may be less well defined and the consequence of error may be higher than at Level 2.	Significant judgement required in making an appropriate decision.

Examples of Complexity Levels for Decision Making

LEVEL 1

Receptionists decide when to interrupt calls or put people on hold. Some protocol exists that guides these decisions.

Cashiers decide whether or not to ask young persons buying cigarettes for identification to determine their age.

Farm labourers decide which potato seedlings to keep and which to throw out.

LEVEL 2

Pharmacy assistants make weekly decisions about stock, what and how much to order, when to try something new, and when to discontinue a product.

Cable installers look for the most effective way of installing cables, i.e., is it better through this wall or that wall?

Nursery workers assist customers in purchasing decisions about types and quantities of trees and shrubs.

LEVEL 3

Front desk clerks working in busy hotels decide on priorities of who and what comes first.

Boom operators make decisions such as deciding where to hook up and pick up pipes. When moving pipes, operators judge when pipes will swing and how and when to swing them back.

Trappers decide what animals to trap, if any, based on animal populations and market projections. They decide where and how to place a trap for a particular animal, based on experience, knowledge of the animal's size and shape, observation of its habits, and the terrain and vegetation.

LEVEL 4

Production clerks, after studying various transportation options for hauling lumber, decide what method of transport to recommend. This recommendation is not easily reversed because of the amount of time and analysis required to make the recommendation.

Nurse practitioners often make emergency patient health decisions alone without the backup of doctors.

Bailiffs, in executing seizure of assets, decide if debtors are trustworthy enough to leave the assets with or whether to incur the expense of moving and storing them. A wrong decision could mean the debtor leaves with the seized goods and the bailiff has to conduct a very costly, time-consuming search.

2. Examples - Decision Making

This section contains a **list** of Examples of the decision making tasks done by workers in the occupational group. This is not a complete list. Rather, it provides a "picture" of the nature and range of text reading tasks performed within the occupational group.

Each example is followed by a number that indicates its level of complexity.

For a more detailed discussion of examples in the Essential Skills Profiles, please refer to *4.3.2. Examples* in the *Introduction*.

Application 3. Critical Thinking

This section is currently under development. If you have any questions, please [contact us](#).

Application 4. Job Task Planning and Organizing

Job Task Planning and Organizing refers to the extent to which the workers plan and organize their own tasks. It does not refer to involvement in the planning function for the organization in which they work.

The **Job Task Planning and Organizing** section of the Profile has two components.

1. Complexity Rating

2. Description

1. Complexity Rating - Job Task Planning and Organizing

The information on Complexity Rating is presented at the beginning of the Job Task Planning and Organizing section in each Essential Skills Profile.

There are **four levels** of complexity, and the rating given is usually one rating, not a range, because it characterizes the whole occupation, not individual tasks. However, there may be more than one rating if more than one occupation is included in the profile and they differ on this characteristic, or if the occupation is performed in two substantially different situations, which would be rated at different levels of complexity.

The Job Task Planning and Organizing Scale is based on **seven dimensions**:

- the extent of variety in work activities;
- whether the task sequence is provided to the worker or determined by the worker;
- whether priorities are provided to the worker or determined by the worker;
- the extent to which the day's work plan is disrupted;
- the extent to which the worker's own work plan must be integrated with the work plans of others;
- the number of sources for work assignments; and
- the extent to which the order of those tasks sequenced by the worker makes a difference to total efficiency.

Each level of the Job Task Planning and Organizing Scale is defined with reference to all four dimensions. Occupations that are more difficult on one dimension of the complexity rating scale may be more or less difficult on the others as the seven dimensions function somewhat independently. For example, the complexity of "the extent of variety of work activities" may fit in Level 2 while the complexity of "whether priorities are provided to the worker or determined by the worker" fits in Level 3. The complexity rating assigned to an occupation is the best summary description of its level of complexity.

Job Task Planning and Organizing Rating Scale				
Dimension	**Level 1**	**Level 2**	**Level 3**	**Level 4**
The extent of variety in work activities	Little variety; similar, repetitive tasks.	Repetitive tasks but the content of the task varies somewhat between repetitions.	There is variety but within a structure or routine.	There is significant variety; no set structure or routine; different work plan each day.
Whether the task sequence is provided to the worker or determined by the worker.	Worker has little or no authority to order tasks.	Worker has some scope to order tasks within the constraints of a framework determined by superiors, a trade practice or professional standard for doing a job.	Worker has wide scope to determine order of tasks within the constraints of an over all framework, a trade practice or professional standard for doing a job or a project work plan.	Worker has authority to determine the order of tasks.
Whether priorities are provided to the worker or determined by the worker	Worker does not prioritize work; priorities are provided to worker or worker performs tasks as they come (no	The priority to be given to various categories of tasks is provided to the worker. The worker then places particular	Work priorities set by worker, but subject to confirmation or approval by superiors.	Worker priorities set by worker.

Job Task Planning and Organizing Rating Scale				
Dimension	**Level 1**	**Level 2**	**Level 3**	**Level 4**
	prioritization).	tasks into these categories to determine their priority.		
The extent to which the day's work plan is disrupted	No work plan for the day or work plan very rarely disrupted.	There are disruptions but worker can return to day's work plan after the disruption; no new work plan is required.	There are disruptions after which the work plan requires significant adjustment, perhaps involving the re-sequencing of tasks or the rescheduling of people or things.	Day's work plan is revised on an ongoing basis due to disruptions; revision may involve re-prioritizing.
The extent to which the worker's own work plan must be integrated with the work plans of others	Works independently; no need to integrate with work plans of others.	Some co-ordination of work plan with the work plans of others is required, for example, to schedule access to shared tools and equipment.	Work plan must be integrated with work plan of other worker(s) to manage the ongoing integration between these jobs; the integration among the jobs already exists and only needs to be co-ordinated.	Work plan requires making arrangements with various others to integrate work plan with theirs; the integration must be created.
The number of sources for work assignments	Single source for work assignments.	Worker has some limited choice over source of	Worker has several sources of work	Worker has multiple sources of work

Job Task Planning and Organizing Rating Scale				
Dimension	Level 1	Level 2	Level 3	Level 4
		work assignments.	assignments with the possibility that there will be competing or conflicting demands on their time; however, there are established criteria or procedures for deciding between assignments.	assignments with the possibility that there will be competing or conflicting demands on their time; he or she must use judgement to decide between assignments.
The extent to which the order of those tasks sequenced by the worker makes a difference to total efficiency	Not applicable (worker has no authority to order tasks).	No work plan required but worker may order tasks in a way that impacts on productivity.	Worker sequences multiple tasks for efficiency. This function is considered an important, but minor part of the job.	Worker sequences multiple tasks for efficiency. This function is considered a major part of the job.

Examples of Complexity Levels for Job Task Planning and Organizing

LEVEL 1

Silviculture workers spend each day planting trees according to instructions from foremen who follow the silviculture prescription.

Laundry workers wash loads and press items brought in by customers.

LEVEL 2

Receptionists respond to the demands of phone calls and visitors. In addition, they must do longer range planning for month-end paper work and some contingency planning.

Nannies plan their work according to the needs and moods of individual children. They co-ordinate these demands with regularly scheduled activities such as providing meals and snacks.

LEVEL 3

Dental lab bench workers plan and organize workloads consisting of 20 or 30 cases, some of which require co-ordination with other workers. Some tasks are rush jobs and others require customers' presence such as trying on products. Workers must re-prioritize as new tasks come in.

*Pre-press technician*s determine the order in which print jobs will be completed approximately two weeks in advance with modifications occurring almost every day based on new jobs, rushes and arrival of materials.

LEVEL 4

Union business agents handle inquiries, grievances, negotiations, etc. They must plan each day efficiently. No two days are the same.

Sales managers plan their activities daily, weekly and long term to fit in client meetings, presentations, planning meetings, new client requests, deadlines for quotes and promotional materials, communication with other departments, and ongoing marketing analysis.

2. Description - Job Task Planning and Organizing

This section provides, in a **paragraph**, a description of the planning and organizing done by workers in the occupational group. Where more than one rating of complexity has been assigned, the reason for variation is indicated.

Application 5. Significant Use of Memory

Significant Use of Memory includes any significant or unusual use of memory for workers in the occupational group. It does not include normal memory use that is a requirement for every occupation.

The **Significant Use of Memory** section of the Profile does not include a complexity rating.

Significant Use of Memory consists of one component.

1. Examples

1. Examples - Significant Use of Memory

This section contains a **list** of Examples of tasks requiring a significant use of memory that are performed by workers in the occupational group. This is not a complete list. Rather, it provides a "picture" of the nature and range of significant memory use performed within the occupational group.

For a more detailed discussion of examples in the Essential Skills Profiles, please refer to *4.3.2. Examples* in the *Introduction*.

Three types of memory use were considered.

Type 1

Purposeful memorization of procedures, codes, parts number, etc.

Memorization through repetition.

> *Rural route carriers* remember the order of streets when organizing delivery routes.

> *Cashiers* remember product codes.

> *Luggage attendants* must remember airport codes to sort luggage quickly and correctly.

Type 2

Remembering information for brief periods, e.g., minutes or hours.

> *General office clerks* remember the current whereabouts of key individuals who may need to be contacted quickly.

> *Waiters* remember different lists of "specials" each day.

> *Labourers* are told several things they are to do and must remember this list of tasks until all are completed.

Type 3

Unique events in which "learning" occurs from one exposure.

> *Pharmacy assistants* remember a customer's request for a potentially dangerous, non-prescription drug when the customer makes follow-up inquiries.

> *Outdoor sports and recreational guides*, faced with mechanical problems, remember how they improvised engine repairs to solve similar problems in the past.
> *Nursery workers* remember diagnoses of plant disease and damage conditions in order to identify them in the future.

Application 6. Finding Information

Finding Information involves using any of a variety of sources including text, people, computerized databases or information systems. Finding Information is highlighted in this section of the Profile as an essential job skill. However, workers' use of various information sources may be referred to in other sections such as *A. Reading Text, B. Document Use, E. Oral Communication* and *H. Computer Use*.

The **Finding Information** section of the Profile has two components.

1. Complexity Rating

2. Examples

1. Complexity Rating - Finding Information

The information on Complexity Rating is presented at the beginning of the Finding Information section in each Essential Skills Profile.

Complexity is rated on **a four-level scale** based **on two dimensions**:

- the complexity of locating the desired information; and
- the complexity of extracting and processing the information.

Each level of the Finding Information Scale is defined with reference to both dimensions. Tasks that are more difficult on one dimension of the complexity rating scale may be more or less difficult on the other as the two dimensions function somewhat independently. For example, the complexity of "locating desired information" may fit in Level 2 while the complexity of "extracting and processing information" fits in Level 3. The complexity rating assigned to a task is the best summary description of its level of complexity.

Finding Information Complexity Rating Scale				
Dimension	**Level 1**	**Level 2**	**Level 3**	**Level 4**
The complexity of locating the desired information	Consulting established sources, e.g., looking up a phone number in a phone book, calling an airline information number for flight schedule information, consulting a manual, calling a software hotline. Source is supplied to worker, e.g., telephone interviewer who is supplied with the names or numbers to call.	No established source but a source can be easily identified, e.g., workers may enquire of their supervisor or co-workers, "Who would know . . . A	Worker must conduct a more complex search for the information, e.g., locating witnesses to a crime, setting up appropriate interviews for a research project, collecting appropriate samples for environmental tests.	Information from several different sources must be brought together or there is no source; the information must be created, e.g., conducting research to find a new vaccine.
The complexity of extracting/ processing the information	Information is usable in the form in which it is obtained, e.g., a phone number, a flight time, information on which key indents text in a particular word processing package.	Simple processing, such as selecting information according to some predetermined criteria, e.g., putting together a bibliography, making a list of suppliers for some service in a particular area.	Some analysis required. Information must be understood to be acted upon.	Complex analysis or synthesis. Information from various sources is synthesized. Information is used in the process of generating a solution to a problem. Information is created.

Examples of Complexity Levels for Finding Information

LEVEL 1

Rural route carriers consult a three ring binder when replacing lost keys. The key number is recorded in a schematic representing route mailboxes.

Funeral attendants ask for and receive information about particular funerals from funeral directors, immediately, verbally.

LEVEL 2

Library clerks find information about the uses of specialized software programs in library procedure manuals. They also use alternate sources of information such as computer help files and asking library assistants and librarians.

Babysitters, nannies and parents' helpers find information about appropriate activities and upcoming events in such sources as flyers and recreational directories.

LEVEL 3

Actors consult books and experts to create characters.

Water processing operators access information by selecting one of 100 computer screens. They access reference material through specialized software programs on networks available to some operators.

LEVEL 4

Telecommunications repair workers draw on information from manuals, other technicians and manufacturers to find solutions to difficult and unique technical problems.

Silviculture workers refer to different reference maps including forest cover maps, aerial maps, contour maps, road maps, guide and trapper maps and maps showing houses of and areas belonging to native groups, as well as forestry regulations. They synthesize all of this information when they develop silviculture planting plans.

2. Examples - Finding Information

This section contains a **list** of Examples of tasks involving finding information done by workers in the occupational group. This is not a complete list. Rather, it provides a "picture" of the nature and range of finding information tasks performed within the occupational group.

Each example is followed by a number that indicates its level of complexity.

For a more detailed discussion of examples in the Essential Skills Profiles, please refer to *4.3.2. Examples* in the *Introduction*.

G. Working with Others

Section Overview

Working with Others examines the extent to which employees work with others to carry out their tasks. Do they have to work co-operatively with others? Do they have to have the self-discipline to meet work targets while working alone?

Working with Others consists of two parts.

1. Description of Work Context
2. Supervisory or Leadership Activities

1. Description of Work Context

This description, in the form of an **untitled paragraph** at the beginning of the Working with Others section in each Essential Skills Profile, outlines the ways in which workers interact with one another to carry out their tasks. This section covers **four types of work contexts**. Knowing whether workers work alone, independently, with partners or as team members will help readers understand the skills workers use in their jobs.

As well, this section provides an idea of the variety of work interactions found within an occupational group. Workers may work independently most of the time, but work with partners in certain circumstances. For example, "Longshoremen work independently when operating forklifts in the yards but work with partners to load cargo into the hold of a ship."

Types of Work Contexts

Work alone

> Employees work alone providing products or information on progress to others.

> *Home-based production workers* work alone within their home environments.

Work independently

> Workers are not physically alone but work independently, co-ordinating their work with that of others.

Receptionists in a large office and *production line workers* with responsibility for a very specific part of the process are in physical environments that include other workers. However, they work essentially on their own.

Work jointly with a partner or helper

One worker co-ordinates and co-operates with only one other co-worker at a time.

A *tradesperson* works with an apprentice.

A *dental assistant* works with a dentist.

Work as a member of a team

A team is a group of workers who produce a product or accomplish a task through combined effort and organized co-operation.

Members of a *film crew* work together to create a feature film or documentary.

2. Participation in Supervisory or Leadership Activities

Participation in Supervisory or Leadership Activities describes, in a standardized way, the leadership or supervision tasks performed in the occupational group. This information is presented as a **list.**

There are 12 supervisory or leadership activities. However, the entire list will not necessarily appear in a particular Essential Skills Profile. Only those that apply to the occupational group will be listed.

Participation in Supervisory or Leadership Activities is only found in Essential Skills Profiles based on occupational groups found in the *National Occupation Classification* (NOC). For profiles developed through National Occupation Standards and Red Seal Occupational Analyses, these activities are assumed to be covered elsewhere in the standard, if applicable.

The Participation in Supervisory or Leadership Activities may include one or more of the following 12 functions:

- participate in formal discussions about work processes or product improvement.

- have opportunities to make suggestions on improving work processes.

- monitor the work performance of others.

- inform other workers or demonstrate to them how tasks are to be performed.

- orient new employees.

- make hiring recommendations.

- make hiring decisions.

- select contractors and suppliers.

- assign routine tasks to other workers.

- assign new or unusual tasks to other workers.

- identify training that is required by, or would be useful for, other workers.

- deal with other workers' grievances or complaints.

The symbol **>** appears in Participation in Supervisory or Leadership Activities. For a detailed discussion of this symbol, please refer to *Use of Symbols* in *4.3.3. The Summary Section* in the *Introduction*.

H. Computer Use

Section Overview

Computer Use indicates the variety and complexity of computer use within the occupational group.

The **Computer Use** section of the Profile has two main components.

1. Complexity Rating

2. Computer Use Summary

1. Complexity Rating

The information on Complexity Rating is presented at the beginning of the Computer Use section in each Essential Skills Profile. Computer use is rated on a **five-level scale** of complexity.

Descriptions of each complexity level are displayed in the chart on the next page. Examples that illustrate the levels follow the chart.

Computer Use Complexity Scale

Level 1	Level 2	Level 3	Level 4	Level 5
Tasks which require only a basic interaction with computer-controlled equipment. Computer use that is limited to a few basic commands with no knowledge of software required. Other Task Characteristics Limited number of steps that can be memorized as a sequence. No variation in computer use task from one instance to the other.	Tasks which require the use of several, familiar software features such as the simple formatting of text or a one-dimensional search of a database. Software used for a limited number of functions; data entry into pre-existing structures; conversion of files from one format to another; production of letters and memos in standard formats. Other Task Characteristics Software is set up by someone else and used with 'default' values.	Tasks which involve multiple operations and the use of a wide range of software features or options. Other Task Characteristics User may be largely responsible for setting-up the software, customizing the interface, and configuring the software and hardware as required. Work may be automated by the creation and/or use of macros, templates or scripts. Tasks are more varied than at level 2 and may involve some experimentation and problem-solving to achieve the desired results.	Complex tasks which may require user to select the software which is most appropriate for the work. Tasks which involve multiple operations and the extensive use of software functions and features. Tasks which require the integrated use of several software packages to accomplish the job task. Manage an existing network. Add/modify user accounts; perform routine maintenance and system management. Other Task Characteristics User may need to access little-used features and options of the software to complete some tasks.	Tasks which involve assessment of information technology needs, selection of appropriate computing and software solutions, and the evaluation of outcomes. Tasks which require the expert knowledge of computer software and information technology systems needed to design, write and customize computer programs for specific purposes.

LEVEL 1

Perform tasks which require only a basic interaction with computer-controlled machinery or equipment.

> Includes the entry of pre-defined codes into computer-controlled machinery; responses to messages on a computer screen; and responses to lights on a console**.**

Computer use that is limited to a few basic commands with no knowledge of software required.

> May include log-on and log-off sequences or some entry of data or messages.

Sample Tasks

- Enter code into commercial keylock fuel dispenser.

- Retrieve/print e-mail; Send brief e-mail message to one recipient.

- Produce/send/print simple unformatted message using the keyboard.

Illustrative Examples

Retail sales clerks enter product information using retail point-of-sale billing software, then use a function key to print an invoice.

Bus ticket agents respond to instructions on computer screens and press buttons to print tickets.

Pharmacy assistants press function keys to get computers to print out daily dispensing orders.

Railway track maintainers log onto the internal mail system at the start of every shift and print out messages from the dispatch office.

LEVEL 2

Perform tasks which require the use of several, familiar software functions.

> This may include a one-dimensional search of a database; word processing with simple editing and formatting of text; data entry into pre-existing structures; conversion of files from one format to another; or the production of letters and memos in standard formats.

Sample Tasks

- Use word processor to produce letters and memos in pre-set formats.

- Send e-mail to multiple users; send e-mail with attachments; forward messages to other recipients.

- Enter data into existing spreadsheets and databases.

Illustrative Examples

Car rental agents use computer database programs to track details of car rentals.

Health and Safety Coordinators use basic word processing skills to produce draft letters and save them as electronic files for the secretary to format and print.

Library clerks write letters to patrons requesting the return of overdue library materials.

Mechanical assemblers and inspectors post questions to an electronic bulletin board which links dealers across North America.

LEVEL 3

Perform tasks which involve multiple operations and the use of a wide range of software features or options.

Sample Tasks

- Create and modify spreadsheets for data entry.
- Produce documents with extensive formatting features such as page numbering, headers and footers, heading levels, indexes, etc.

- Use software to produce original drawings and illustrations.

- Give one-on-one computer instruction or orientation to co-workers.

Illustrative Examples

Computer salespersons demonstrate features of popular programs such as Windows 98, Netscape Navigator and Corel Draw.

Telephone information operators use custom software to scan several databases for telephone numbers, long distance service rates, and time and charges information. Search strategies used vary with the information given by the customer.

Lab technicians in manufacturing build spreadsheets to organize and manipulate production data. They also use the graphing features of the software to analyze the data and present a variety of views to the rest of the production team.

Gas plant operators use a distributed control system to monitor and control gas plant operations. The system gives the operator a variety of information types in varying degrees of detail, and the ability to control hundreds of processes throughout the plant.

LEVEL 4

Perform complex tasks which involve multiple operations and the extensive use of software features. The worker may be required to select the software which is most appropriate for the work to be done. Tasks at this level may also require the integrated use of several software packages.

Manage an existing computer network.

> This may include adding and modifying user accounts; adding and removing hardware and software; and performing routine maintenance and system management.

Sample Tasks

- Create publications or presentations with linked and embedded objects created in other programs.

- Create and define database structures, queries, and forms. Design sorting and filtering processes to extract data from the database.

- Provide software training or coaching to groups of other workers.

Illustrative Examples

Network technicians use specialized software to generate and analyze Internet usage statistics. This data is reported quarterly by user, by department and by job number.

Graphic arts technicians create and modify graphics using programs such as PhotoShop, Corel Draw or Illustrator; assemble text and graphics in page layout programs like PageMaker or Quark Express. They must be able to support this work using a variety of utility programs for managing fonts; trapping and correcting colour; and compacting and archiving large files.

LEVEL 5

Perform tasks which involve assessment of information technology needs, selection of appropriate computing and software solutions, and the evaluation of outcomes.

Perform job tasks which require the expert knowledge of computer software and information technology systems needed to design, write and customize computer programs for specific purposes.

Design and set-up new computer networks. Organize user accounts and system resources; write batch files and operating system scripts.

Sample Tasks

- Assess computer system and network needs. Organize needs assessment process; design computer network and/or software in response to needs.

- Design and set-up new computer networks. Organize user accounts and system resources; write batch files and operating system scripts.

- Work with users to design or adapt information technology for specific contexts and applications.

- Evaluate and select hardware and software appropriate to the application.

- Professional software training.

Illustrative Examples

Financial planners write software that will allow companies to track good and bad credit risks based on several loan information variables.

Systems analysts design new payroll systems after consulting with companies' human resources departments and customers of the system.

Information technology managers make decisions about expanding network services based on past usage patterns and the current business plan.

2. Computer Use Summary

The Computer Use Summary describes, in a standardized way, all of the computer use performed in the occupational group. The information is presented as a **list.**

There are nine computer use applications. However, the entire list will not necessarily appear in a particular Essential Skills Summary . Only those that apply to the occupational group will be listed. Each application is followed by an example that illustrates how it is used in within the occupational group.

The Computer Use Summary may include one or more of the following nine applications:

- use word processing (e.g., WordPerfect, Microsoft Word, Ami Pro, WordPad).

- use graphics software (e.g., Corel Draw, Harvard Graphics, Adobe Photoshop, Adobe Illustrator).

- use a database (e.g., dBase, MS Access, MS Act, Claris FileMaker, PC File).

- use a spreadsheet (e.g., MS Excel, Lotus 1-2-3, Quattro Pro).

- use financial software (e.g., Bedford Accounting, AccPac, QuickBooks).

- use statistical analysis software (e.g., SPSSx, SAS, Statistica).

- do programming and systems and software design (e.g., Fortran, Cobol, Clipper, Visual Basic, Macromedia Director).

- use computer-assisted design, manufacturing and machining (e.g., CAD/CAM, AutoCAD, CNC (Computer Numerical Control) equipment).

- use communications software (e.g., Procomm, Netscape Mail, VaxMail, MS Outlook).

Some occupational groups have tasks that involve other uses of computers. These are noted in addition to the standard list.

The symbol > appears in the Computer Use Summary . For a detailed discussion of this symbol, please refer to *Use of Symbols* in 4.3.3. *The Summary Section* in the Introduction.

I. Continuous Learning

Section Overview

Continuous Learning examines the requirement for workers in an occupational group to participate in an ongoing process of acquiring skills and knowledge.

Continuous Learning tests the hypothesis that more and more jobs require continuous upgrading, and that all workers must continue learning in order to keep or to grow with their jobs. If this is true, then the following will become essential skills:

- knowing how to learn;
- understanding one's own learning style; and
- knowing how to gain access to a variety of materials, resources and learning opportunities.

Continuous Learning consists of two main sections:

1. Description of Learning

2. How Learning Occurs

1. Description of Learning

This description, in the form of an **untitled paragraph** at the beginning of the Continuous Learning section in each Essential Skills Profile, outlines the ongoing learning or skills upgrading that is required in the occupational group. This description may include the following types of learning:

- training in job-related health and safety;
- obtaining and updating credentials; and
- learning about new equipment, procedures, products and services.

2. How Learning Occurs

How Learning Occurs describes, in a standardized way, all of the ways in which learning is acquired by workers in the occupational group. The information is presented as a **list**.

There are five ways learning occurs. However, the entire list will not necessarily appear in a particular Essential Skills Profile. Only those that apply to the occupational group will be listed.

How Learning Occurs may include one or more of the following 5 items:

- as part of regular work activity.

- from co-workers.

- through training offered in the workplace.

- through reading or other forms of self-study:
  - at work.
  - on worker's own time.
  - using materials available through work.
  - using materials obtained through a professional association or union.
  - using materials obtained on worker's own initiative.

- through off-site training:
  - during working hours at no cost to the worker.
  - partially subsidized.
  - with costs paid by the worker.

The symbol **>** appears in the How Learning Occurs Profile. For a detailed discussion of this symbol, please refer to *Use of Symbols* in *4.3.3. The Summary Section* in the *Introduction*.

J. Other Information

Section Overview

Other Information summarizes additional information collected during the interviews.

Other Information consists of three main sections.

1. Physical Aspects

2. Attitudes

3. Future Trends Affecting Essential Skills

1. Physical Aspects

Physical Aspects is designed to give readers a general appreciation for the physical demands of a job as opposed to an in-depth analysis. It summarizes what interviewees said about the psychomotor and sensory aspects of their jobs.

It is important to note that interviewees were asked about how they did their jobs, not about other ways jobs could be performed. Thus, while the information suggests the kind of physical demands someone might encounter within the occupational group, it does not indicate specific occupational requirements.

Physical Aspects are only found in Essential Skills Profiles based on occupational groups found in the *National Occupation Classification* (NOC).

2. Attitudes

Interviewees were asked, "What attitudes should someone have to do this job well?" This section summarizes the responses in a **descriptive paragraph.**

Career counsellors may find this information useful to assist people in selecting occupations.

Attitudes are only found in Essential Skills Profiles based on occupational groups found in the *National Occupation Classification* (NOC).

3. Future Trends Affecting Essential Skills

The section provides, in a **descriptive paragraph**, information on how essential skill use in the occupational group may change in the future and implications for skills development and training.

The information in this section comes from interviews with workers and, where possible, their employers.

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