

**SUSTAINABLE
ESSENTIAL
SKILLS**

**INSTRUCTOR'S
GUIDE**



Table of Contents

Section 1	
Introduction	1
Section 2	
Essential Skills and Technical Training.....	7
Section 3	
Characteristics of Tasks and Apprentices	17
Section 4	
Addressing Essential Skills Gaps.....	35
Section 5	
Integrating Essential Skills into Technical Training	45

Section 1

Introduction

Most technical training instructors are hired for their knowledge and expertise in the trade. While this expertise and know-how are acquired on the job, gaining effective teaching strategies is a skill that develops with experience. Many instructors have the opportunity to participate in instructor diploma programs to learn more about the teaching aspect of their role in the classroom. An Essential Skills endorsement is another set of tools to add to their instructor toolbox.

As a technical training instructor, you want the apprentices in your classes to succeed in technical training and to pass Red Seal and provincial examinations. You are familiar with the challenges that apprentices face when they enter technical training and know that each apprentice brings unique skill sets to the classroom. Some apprentices have been out of school for several years; others lack the Essential Skills they need to keep up with the fast pace of technical training. Some may have excelled in high school while some may have struggled with or not completed an academic program.

Even apprentices who have completed high school with modest success often find the application of skills challenging. For those apprentices with limited reading skills, the idea of making sense of code is daunting. Many apprentices have lost math skills that they once knew. For a smaller number, school was not a positive environment and they simply did not acquire the skills needed to begin apprenticeship or other technical training.

The construction industry has become more reliant on technical training. On-the-job mentoring is sometimes put aside as production demands increase. More is expected in terms of curriculum coverage and yet an increase in time is not allotted. With these pressures, instructors have a significant responsibility to lead each apprentice or trainee successfully to completion. An employer or sponsor has invested in the apprentice on the job; now they depend on the training institution to contribute to their initial investment.

Understanding Essential Skills and sharing best practices to address classroom challenges can be done collaboratively. Increasing Essential Skills expertise in construction training ensures success for apprentices and the continuity of highly skilled tradespeople for the industry. Technical training instructors welcome resources that help every apprentice acquire skills and training. The goal of this guide and the trades worksheets is to enhance technical training and increase success rates.

In this set of publications, apprentices are the learner group. All of the instructional examples included were suggested by trades instructors who provide block training to meet the standards of the formal apprenticeship program in 13 different trades. Instructors or educators enrolling pre-apprentices, youth-at-risk, or others in construction-related training will also find these materials valuable.

What are the goals of this guide?

This instructor's guide is a "how to" manual for technical training instructors. It is designed to demonstrate and teach how to integrate Essential Skills into technical training materials and worksheets. Integrating Essential Skills into technical training materials means:

- anticipating the factors that make tasks more or less complex
- structuring learning activities to bridge skill levels
- ensuring apprentices understand the structure of documents
- providing strategies for finding information in texts
- designing worksheets that have clear examples with steps and are effective at more than one level of complexity
- providing consistent strategies for learning

Practicality at the classroom level is foremost in this resource. You can refer to the various sections of the guide and apply them immediately into the classroom or adapt an idea that could enhance existing materials.

How this guide is organized

This guide has five sections.

- **Section 1 Introduction** explains the goal of the instructor's guide and gives an overview of this project in relation to previous Essential Skills projects.
- **Section 2 Essential Skills and Technical Training** makes a case for integrating Essential Skills into technical training. It shows how three of the Essential Skills (Reading, Document Use and Numeracy) are a part of technical training.
- **Section 3 Characteristics of Tasks and Apprentices** describes three Essential Skills and their levels, giving examples of what is required for competency at each level. Examples of technical training tasks for each level of these Essential Skills are also provided.
- **Section 4 Addressing Essential Skills Gaps** identifies Essential Skills gaps and provides strategies for instructing apprentices at these levels.
- **Section 5 Integrating Essential Skills into Technical Training** provides a strategy for developing or adapting learning materials to integrate Essential Skills into new or existing technical training worksheets.

How to use the guide and the trades worksheets

This instructor's guide gives you the information you need to first identify and then address Essential Skills gaps of your apprentices. Section 5 of the guide demonstrates one Essential Skills strategy for addressing those gaps. The worksheets in *Trades Worksheets* A-G, H-P and R-W are a collection of real trades worksheets developed using this Essential Skills strategy. The worksheets can be used as is or they can be used as examples and models for developing other worksheets and materials.

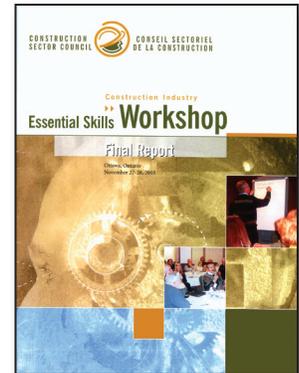
More importantly, the worksheets also help in delivery of technical training. By examining what methods are most effective in achieving training goals, you can adapt and develop materials to address the wide range of learning needs in a training classroom.

Building on previous initiatives

The instructor's guide and accompanying trades worksheets build upon previous Essential Skills initiatives by the Construction Sector Council (CSC) and its partner SkillPlan. Previous Construction Sector Council Essential Skills projects were designed to meet specific needs in the construction industry. All of these materials can be downloaded or ordered from the Construction Sector Council website.

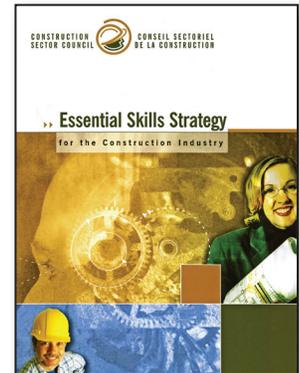
- **Essential Skills Symposium (2003)**

The CSC hosted a gathering of industry representatives to increase awareness of Essential Skills activities and best practices. The report documents the outcomes of the symposium and the industry's input into a strategy for CSC's work in Essential Skills.



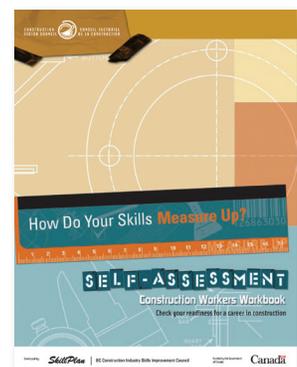
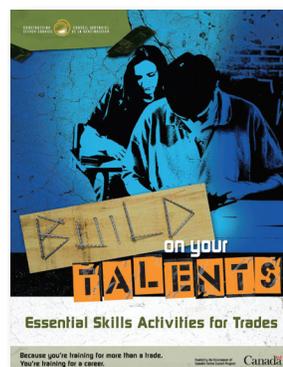
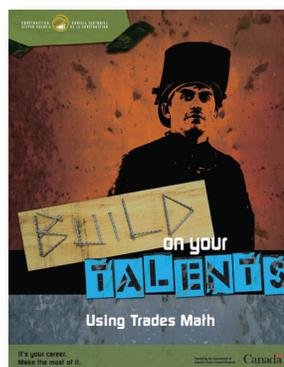
- **Essential Skills Strategy (2005)**

The CSC uses the *Essential Skills Strategy for the Construction Industry* to guide its work with industry stakeholders to ensure that construction workers have the levels of Essential Skills they need to fully participate in training and employment. The strategy includes five key elements: research, awareness, coordination, training and standards, and a clearinghouse function.



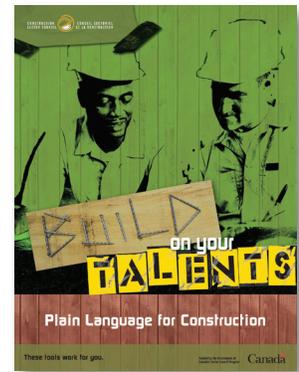
- **Essential Skills Tools (2006-2009)**

These were designed to increase awareness of Essential Skills, especially for those individuals who are entering trades. Emphasis is placed on the skills that are needed and to help individuals understand that skilled trades require high levels of Essential Skills.



Section 1

The publication *Plain Language for Construction* addresses the unnecessary complexity of some documents. By presenting information clearly, employers and others can make information easier to access.

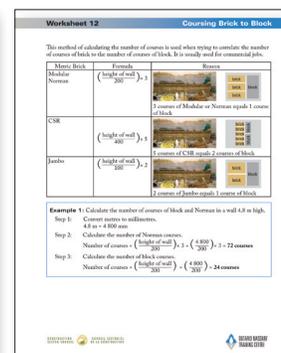
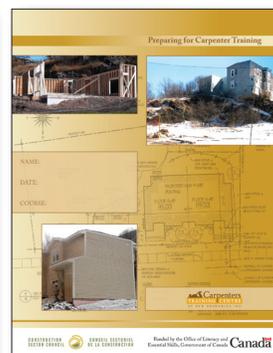
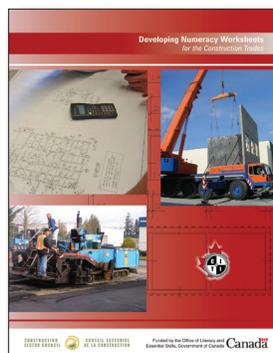
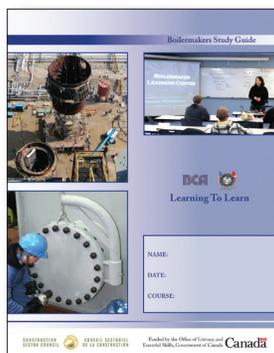


The *Step Up* series provides an opportunity for tradespeople to practice the Essential Skills required when moving from the tools into a supervisory role.



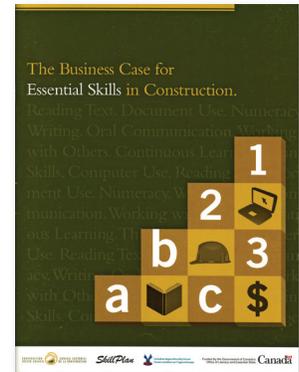
- **Essential Skills Workplace Services (2009)**

Each of these publications or websites was designed to meet a specific need in the construction industry.



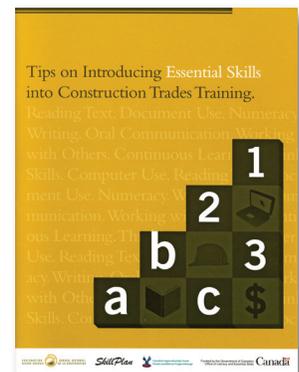
- **Essential Skills Business Case (2010)**

This research project looked for an answer to the question “What effect does Essential Skills training have on completion rates and performance in apprenticeship and other training programs?” The results of the study clearly demonstrated that apprentices who participated in Essential Skills upgrading were significantly more likely to pass their apprenticeship exams or other training exams.



- **Tips on Introducing Essential Skills into Construction Trades Training (2010)**

Trades instructors who are looking for practical ways to teach Essential Skills to apprentices will find useful information in this publication. It provides tips and strategies for teaching Reading, Document Use and Numeracy.

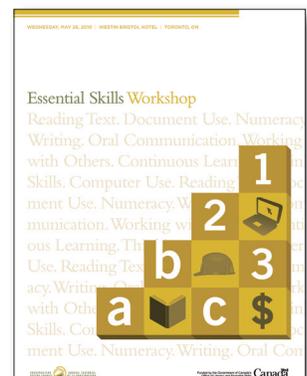


- **Essential Skills Symposium (2010)**

The Essential Skills Symposium brought together representatives from all levels and sectors of the construction industry.

It showcased past projects and emphasized:

- o a strong correlation between Essential Skills and success on the Red Seal exam
- o a need to integrate and build Essential Skills into technical training from the beginning and to add exam-taking skills at the end
- o a need for Essential Skills training and certification of instructors



A long-term vision

This guide and accompanying trades worksheets are in direct response to feedback from the construction industry. Awareness of Essential Skills has grown significantly amongst industry stakeholders. The focus now is on technical trainers and continuing the tradition of excellence in delivering technical knowledge and know-how to meet the needs of apprentices with varying Essential Skills levels.

This resource is part of a larger objective to increase the self-sustaining capacity of the construction industry to apply Essential Skills by:

- developing the skills of industry and others to enable them to integrate Essential Skills into technical training and other applications

Section 1

- supporting the industry in its efforts to improve Essential Skills through the creation of a virtual Essential Skills community
- creating a mechanism (online professional collaboration platform) for sharing Essential Skills learning materials and approaches
- making Essential Skills materials readily available to industry, training instructors and educators
- expanding the field of Essential Skills through collaborative efforts by developing, modeling and implementing Essential Skills solutions to sector challenges

The Construction Sector Council and SkillPlan believe that by providing the means, collaboration amongst technical trainers will evolve. The vision of this initiative is to build on the training expertise that this industry relies on to produce skilled tradespeople. By opening this resource and furthering your interest in Essential Skills, you have become part of the instructor community dedicated to the highest standard of construction training delivery.

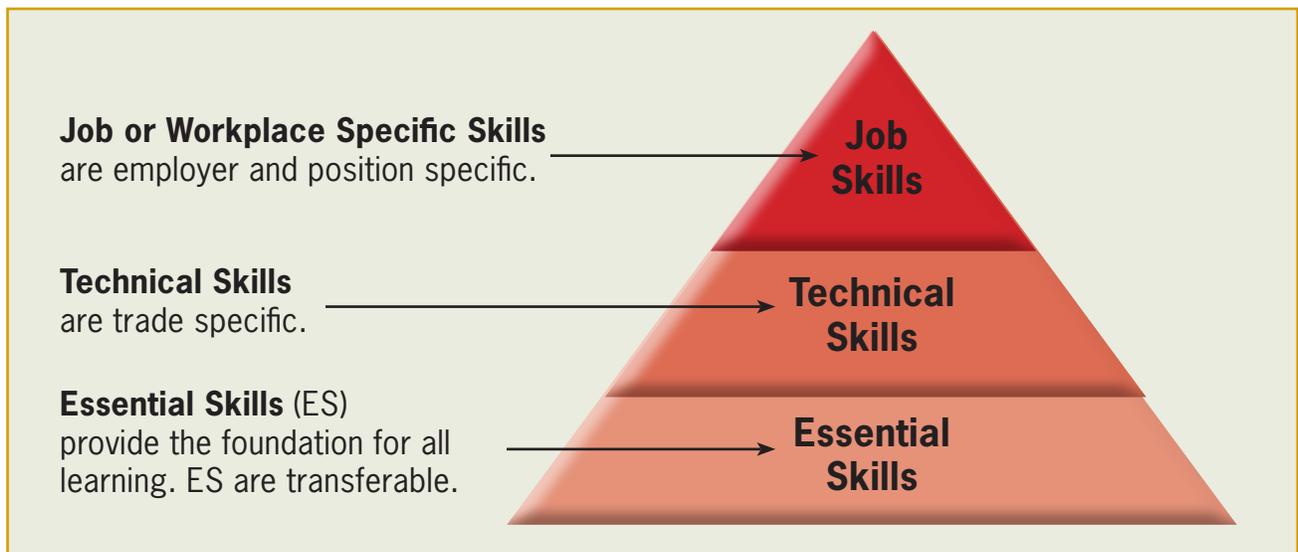
Section 2

Essential Skills and Technical Training

What are Essential Skills?

Essential Skills (ES) are the foundation skills needed at work, at school and at home. They provide the foundation for learning new skills and adapting to change. Below is a pyramid that places Essential Skills at the foundation of learning training skills and job or workplace specific skills. An apprentice who lacks the Essential Skill of Reading will have difficulty learning technical skills by reading. Similarly, calculating weight loads will be difficult for an apprentice who lacks Numeracy skills and is unable to use a formula.

Employability Skills



The Essential Skills referred to in this publication are defined by Human Resources and Skills Development Canada. Many years of research have included interviews with 3000 workers in approximately 300 occupations.

For more information go to <http://www.rhdcc-hrsdc.gc.ca/eng/workplaceskills/LES/index.shtml>.

Essential Skills

Reading

Writing

Thinking Skills

Document Use

Oral Communication

Computer Use

Numeracy

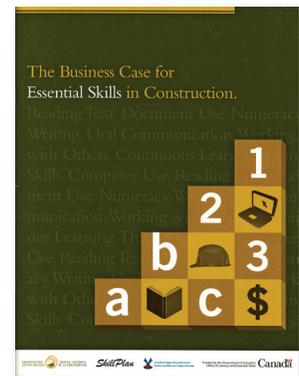
Why integrate Essential Skills into technical training?

On the job, there is little time to focus on tasks that require core Essential Skills when there are many hands-on skills to learn. In technical training, the reverse is true. This is the time for apprentices to learn the theory behind what they experience on the job. They need strong reading skills to cope with the amount of reading material provided. For many, this will be their first real exposure to using building plans for calculations and understanding what is required. Without a strong foundation of Essential Skills, apprentices will have difficulty with what technical training is intended to cover.

As a technical training instructor, you need strategies that provide support for both Essential Skills and technical training for apprentices. Incorporating Essential Skills into technical training allows you to address these needs in a way that is both manageable and organized. While instructing technical material, you can also be teaching Essential Skills that will assist apprentices in becoming independent learners who can use, learn from, manipulate and integrate technical training materials that are often complex and come in a wide variety of formats.

The Business Case for Essential Skills in Construction study, completed in 2010, established the value of Essential Skills upgrading. The study demonstrated that apprentices who received Essential Skills support were significantly more likely to pass their apprenticeship exams.

This important study is further evidence that Essential Skills are contributing factors to apprentice success and retention. Results show that apprentices participating in Essential Skills upgrading also achieved significantly higher final grades. Not only did apprentices get better results, they also self reported an increased confidence in their ability to complete technical training and in their ability to perform on the job.



There is quantifiable evidence that introducing Essential Skills concepts and supporting struggling apprentices have a positive return. What was achieved on a small scale can be greatly expanded. Technical instructors are in the best position to integrate Essential Skills into technical training.

For more information about this study, go to <http://www.csc-ca.org/en/catalog/essential-skills/essential-skills-resources>.

Essential Skills in this guide

The focus of Essential Skills in this publication is applications in technical training rather than on the job. During technical training, apprentices deal with a staggering amount of information provided in a variety of formats within a short period of time. Apprentices use all Essential Skills during technical training with the most frequent being Reading, Document Use and Numeracy.

These three Essential Skills are the focus of this resource because they are most often cited by instructors and apprentices as stumbling blocks to successful completion of technical training.

Section 2

The intent of this guide is to demonstrate how to integrate Essential Skills into technical training materials. This assignment may appear to be one more burden for you, but it is in fact a time saver. Integrating Essential Skills into technical training materials makes it easier to:

- address apprentices' Essential Skills gaps
- create a learning/cognitive sequence that is concrete and explicit and leads to more effective instruction and learning
- identify cognitive hurdles in apprentices' learning and provide appropriate learning solutions

Ultimately, if instructors provide a foundation for learning and reinforce strategies, apprentices will form effective learning habits. This foundation will allow them to not only be successful in technical training, but will also increase their ability to perform successfully on the job.

Section 3

Characteristics of Tasks and Apprentices

Within any apprenticeship class, you will find skill differences among your apprentices. What are strengths for some may be weaknesses for others. Some apprentices have strong hands-on skills, but in technical training, their weak Essential Skills are a barrier to learning. An Essential Skills approach starts by understanding what apprentices are able to do at each level. This insight leads to a clearer understanding about what factors make tasks more or less difficult.

This section presents descriptions of apprentice characteristics at each Essential Skill level along with typical tasks at that level. When you are able to recognise the capabilities of apprentices in terms of levels, you are better able to identify and address the Essential Skills gaps between where the apprentices are and where they need to be. The goal of instruction is to narrow the skills gap by sequencing learning to help apprentices accomplish training outcomes.

Block technical training is delivered in a limited number of weeks and you are under pressure to deliver a set amount of material while at the same time trying to figure out the ability of apprentices to learn that material. The process becomes easier when you see the same apprentices from one year to the next, but it can still be challenging. The limited time frame makes early identification of Essential Skills gaps important. You can make adjustments to your presentations, handouts and worksheets to make a difference in a short amount of time.

Short and frequent quizzes in the first week of technical training are a useful way to assess apprentices. There are existing Essential Skills assessment tools that instructors can use to assess apprentices' skill levels in Reading, Document Use and Numeracy. For example, an instructor may want to assess Document Use skills using drawings that suit a specific trade. Instructors may also use existing assessment publications as models for their own informal assessments using technical training materials. Some publications that instructors may consider using for assessments are available for download at no cost at the Construction Sector Council (CSC) website at www.csc-ca.org.

Section 3

Reading

Reading refers to reading material that is in the form of sentences or paragraphs. Tasks may involve reading notes, emails, notices, memos, texts, manuals, specifications, regulations, reports or journals.

Essential Skill Level	General Description of Skills
Level 1	<ul style="list-style-type: none"> Locate a single piece of concrete information in short pieces of text. <p><i>Example</i> Apprentices locate specific information in product labels to check usage requirements.</p>
Level 2	<ul style="list-style-type: none"> 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. <p><i>Example</i> Apprentices read paragraphs in textbooks that are dense and unfamiliar to answer questions. They follow instructions in handouts and worksheets.</p>
Level 3	<ul style="list-style-type: none"> Locate 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. <p><i>Example</i> Apprentices read and interpret building codes, regulations and standards by integrating information from several sources.</p>
Level 4	<ul style="list-style-type: none"> Integrate and synthesize information from multiple sources or from complex and lengthy texts. Make complex inferences. Evaluate quality of text. <p><i>Example</i> Apprentices use various information sources to troubleshoot. They interpret the texts, looking for conflicting information.</p>
Level 5	<ul style="list-style-type: none"> Interpret dense and complex text. Make high-level inferences and use specialized knowledge. <p><i>Example</i> Apprentices apply their understanding of codes in practice scenarios. They locate various clauses containing applicable aspects of the code, compare them to the given situation, and make an informed decision about code requirements.</p>

Least complex



Most complex

Level 1 Apprentice Characteristics

Reading and Document Use

Apprentices with Level 1 Reading and Document Use skills are able to locate one piece of information in a short piece of familiar text or information display with a clearly identified purpose for reading.

They are able to deal with Reading and Document Use tasks that:

- match key words from the question to the text
- focus on words rather than phrases and sentences
- involve common and concrete words
- involve recognising common formats to find the required information
- involve simple comparisons

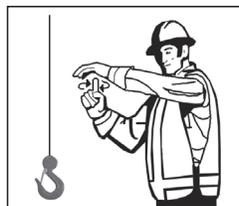
Example

In this task, apprentices locate the required information because they are able to locate and match the key word “STOP.”

Task

Circle the hand signal for **STOP**.

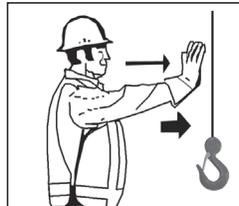
Standard hand signals for controlling crane operations - crawler, locomotive and truck cranes.



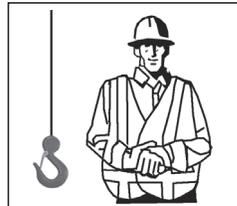
MOVE SLOWLY. Use one hand to give any motion signal and place other hand motionless in front of hand giving the motion signal. (Hoist slowly shown as example).



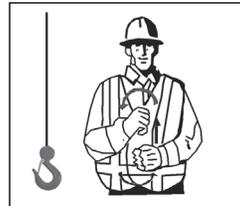
STOP. Both arms outstretched at the sides horizontally, fingers outstretched.



TRAVEL. Arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.



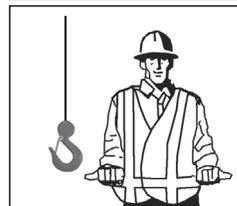
DOG EVERYTHING. Clasp hands in front of body.



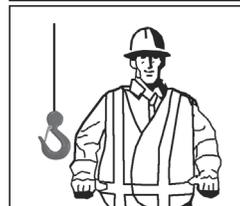
TRAVEL. (Both Tracks). Use both fists in front of body, making a circular motion about each other, indicating direction of travel; forward or backward. (For crawler cranes only.)



TRAVEL. (One Track). Lock the track on side indicated by raised fist. Travel opposite track in direction indicated by circular motion of other fist, rotated vertically in front of body. (For crawler cranes only.)



EXTEND BOOM. (Telescoping Booms). Both fists in front of body with thumbs pointing outward. One hand signal may be used.



RETRACT BOOM. (Telescoping Booms). Both fists in front of body with thumbs pointing toward each other. One hand signal may be used.

Level 4 and 5 Apprentice Characteristics

Reading and Document Use

Apprentices with Level 4 or Level 5 Reading and Document Use skills are able to interpret dense and complex texts and information displays using specialized knowledge and making high-level inferences to generate ideas, construct new knowledge or give an opinion. Level 4 and Level 5 learners can “figure out” unfamiliar and unique information displays.

They are able to deal with Reading and Document Use tasks that:

- include texts of considerable complexity and length
- include texts with new and abstract vocabulary and deal with unfamiliar topics
- include texts that may have conflicting information
- involve summarizing, reorganizing or integrating located information
- require navigating different document types and integrate information located in different parts and modes
- use located information in a different way than the way it is provided

Example

In this task, apprentices are asked to make decisions or evaluate onsite problems or perform unique installations. They need to interpret difficult legal text, such as code, to make non-routine decisions or solve complex problems. They must interpret the code that is written for diverse situations and compare with their specialized knowledge. In some cases the solution will not be evident in the interpretation of the code, which may lead to reading further sources of information. High level of interpretation and judgement of the text is required to solve the problem.

Task
Make decisions or evaluate onsite problems or perform unique installations.

852-05 © Canadian Standards Association

7 Overpressure protection

7.1 Pressure vessel protection

7.1.1 ASME Boiler and Pressure Vessel Code requirements

Pressure vessels shall be provided with pressure-relief protection in accordance with rules specified in paragraphs UC-125 to UC-134, Section VIII, Division 1, of the ASME Boiler and Pressure Vessel Code, with such modifications as are necessary for control of refrigerants.

7.1.2 Pressure vessels with an internal gross volume of 0.085 m³ (3 ft³) or less

Pressure vessels with an internal gross volume of 0.085 m³ (3 ft³) or less containing liquid refrigerant, except as specified in Clause 7.1.5, and that can be shut off for valves from all other parts of a refrigeration system, shall be protected by a pressure-relief device or fusible plug. However, pressure vessels of less than 152 mm (6 in) inside diameter shall be exempt from this requirement.

7.1.3 Pressure vessels with an internal gross volume exceeding 0.085 m³ (3 ft³)

7.1.3.1 General

Pressure vessels with an internal gross volume exceeding 0.085 m³ (3 ft³) containing liquid refrigerant, except as specified in Clause 7.1.5, and that can be shut off for valves from all other parts of a refrigeration system, shall be protected by a pressure-relief device with sufficient capacity to prevent the pressure in the pressure vessel from rising more than 10% above the setting of the pressure-relief device.

7.1.3.2 Pressure vessels with an internal gross volume exceeding 0.085 m³ (3 ft³) but less than 0.28 m³ (10 ft³)

Under the conditions specified in Clause 7.1.3.1, a single pressure-relief device may be used on pressure vessels with an internal gross volume of less than 0.28 m³ (10 ft³).

7.1.3.3 Pressure vessels with an internal gross volume of 0.28 m³ (10 ft³) or more

7.1.3.3.1 General

If a pressure-relief valve is used under the conditions specified in Clause 7.1.3.1, a relief device system consisting of a pressure-relief valve, in parallel with a second pressure-relief valve as described in Clause 7.1.3.2, shall be provided on pressure vessels with an internal gross volume of 0.28 m³ (10 ft³) or more. Each pressure-relief valve shall have sufficient capacity to prevent the pressure in the pressure vessel from rising more than 10% above the setting of the pressure-relief valve. Dual pressure-relief valves shall be installed with a three-way valve to allow testing or repair.

7.1.3.3.2 Pressure-relief valves discharging into the low side of the system

Under the conditions permitted in Clause 7.1.3.2, a single relief valve (not rupture member) of the (10 ft³) or

part of, or as part of, any system with a pressure-relief valve that are in Clause 7.

© Canadian Standards Association Mechanical refrigeration code

Refrigerant member	Factor for SI calculations	Factor for imperial calculations	Refrigerant member	Factor for SI calculations	Factor for imperial calculations
R11	4.9	1	R407B	12.3	2.3
R12	7.8	1.6	R409E	7.8	1.6
R13	9.8	2	R410A	7.8	1.6
R134a	12.3	2.5	R412A	7.8	1.6
R22	7.8	1.6	R413A	9.8	2.0
R23	4.9	1	R414A	7.8	1.6
R113	4.9	1	R418	7.8	1.6
R114	7.8	1.6	R419A	7.8	1.6
R123	4.9	1	R421A	7.8	1.6
R124	7.8	1.6	R422A	7.8	1.6
R134a	7.8	1.6	R423A	7.8	1.6
R150	4.9	1	R424A	7.8	1.6
R290	4.9	1	R425A	7.8	1.6
R401A	7.8	1.6	R426A	7.8	1.6
R402A	7.8	1.6	R427A	7.8	1.6
R403A	7.8	1.6	R428A	7.8	1.6
R404A	7.8	1.6	R429A	7.8	1.6
R405A	7.8	1.6	R430A	7.8	1.6
R406A	7.8	1.6	R431A	7.8	1.6
R407A	7.8	1.6	R432A	7.8	1.6
R408A	7.8	1.6	R433A	7.8	1.6
R409A	7.8	1.6	R434A	7.8	1.6
R410A	7.8	1.6	R435A	7.8	1.6
R411A	7.8	1.6	R436A	7.8	1.6
R412A	7.8	1.6	R437A	7.8	1.6
R413A	7.8	1.6	R438A	7.8	1.6
R414A	7.8	1.6	R439A	7.8	1.6
R415A	7.8	1.6	R440A	7.8	1.6
R416A	7.8	1.6	R441A	7.8	1.6
R417A	7.8	1.6	R442A	7.8	1.6
R418A	7.8	1.6	R443A	7.8	1.6
R419A	7.8	1.6	R444A	7.8	1.6
R420A	7.8	1.6	R445A	7.8	1.6
R421A	7.8	1.6	R446A	7.8	1.6
R422A	7.8	1.6	R447A	7.8	1.6
R423A	7.8	1.6	R448A	7.8	1.6
R424A	7.8	1.6	R449A	7.8	1.6
R425A	7.8	1.6	R450A	7.8	1.6
R426A	7.8	1.6	R451A	7.8	1.6
R427A	7.8	1.6	R452A	7.8	1.6
R428A	7.8	1.6	R453A	7.8	1.6
R429A	7.8	1.6	R454A	7.8	1.6
R430A	7.8	1.6	R455A	7.8	1.6
R431A	7.8	1.6	R456A	7.8	1.6
R432A	7.8	1.6	R457A	7.8	1.6
R433A	7.8	1.6	R458A	7.8	1.6
R434A	7.8	1.6	R459A	7.8	1.6
R435A	7.8	1.6	R460A	7.8	1.6
R436A	7.8	1.6	R461A	7.8	1.6
R437A	7.8	1.6	R462A	7.8	1.6
R438A	7.8	1.6	R463A	7.8	1.6
R439A	7.8	1.6	R464A	7.8	1.6
R440A	7.8	1.6	R465A	7.8	1.6
R441A	7.8	1.6	R466A	7.8	1.6
R442A	7.8	1.6	R467A	7.8	1.6
R443A	7.8	1.6	R468A	7.8	1.6
R444A	7.8	1.6	R469A	7.8	1.6
R445A	7.8	1.6	R470A	7.8	1.6
R446A	7.8	1.6	R471A	7.8	1.6
R447A	7.8	1.6	R472A	7.8	1.6
R448A	7.8	1.6	R473A	7.8	1.6
R449A	7.8	1.6	R474A	7.8	1.6
R450A	7.8	1.6	R475A	7.8	1.6
R451A	7.8	1.6	R476A	7.8	1.6
R452A	7.8	1.6	R477A	7.8	1.6
R453A	7.8	1.6	R478A	7.8	1.6
R454A	7.8	1.6	R479A	7.8	1.6
R455A	7.8	1.6	R480A	7.8	1.6
R456A	7.8	1.6	R481A	7.8	1.6
R457A	7.8	1.6	R482A	7.8	1.6
R458A	7.8	1.6	R483A	7.8	1.6
R459A	7.8	1.6	R484A	7.8	1.6
R460A	7.8	1.6	R485A	7.8	1.6
R461A	7.8	1.6	R486A	7.8	1.6
R462A	7.8	1.6	R487A	7.8	1.6
R463A	7.8	1.6	R488A	7.8	1.6
R464A	7.8	1.6	R489A	7.8	1.6
R465A	7.8	1.6	R490A	7.8	1.6
R466A	7.8	1.6	R491A	7.8	1.6
R467A	7.8	1.6	R492A	7.8	1.6
R468A	7.8	1.6	R493A	7.8	1.6
R469A	7.8	1.6	R494A	7.8	1.6
R470A	7.8	1.6	R495A	7.8	1.6
R471A	7.8	1.6	R496A	7.8	1.6
R472A	7.8	1.6	R497A	7.8	1.6
R473A	7.8	1.6	R498A	7.8	1.6
R474A	7.8	1.6	R499A	7.8	1.6
R475A	7.8	1.6	R500A	7.8	1.6
R476A	7.8	1.6	R501A	7.8	1.6
R477A	7.8	1.6	R502A	7.8	1.6
R478A	7.8	1.6	R503A	7.8	1.6
R479A	7.8	1.6	R504A	7.8	1.6
R480A	7.8	1.6	R505A	7.8	1.6
R481A	7.8	1.6	R506A	7.8	1.6
R482A	7.8	1.6	R507A	7.8	1.6
R483A	7.8	1.6	R508A	7.8	1.6
R484A	7.8	1.6	R509A	7.8	1.6
R485A	7.8	1.6	R510A	7.8	1.6
R486A	7.8	1.6	R511A	7.8	1.6
R487A	7.8	1.6	R512A	7.8	1.6
R488A	7.8	1.6	R513A	7.8	1.6
R489A	7.8	1.6	R514A	7.8	1.6
R490A	7.8	1.6	R515A	7.8	1.6
R491A	7.8	1.6	R516A	7.8	1.6
R492A	7.8	1.6	R517A	7.8	1.6
R493A	7.8	1.6	R518A	7.8	1.6
R494A	7.8	1.6	R519A	7.8	1.6
R495A	7.8	1.6	R520A	7.8	1.6
R496A	7.8	1.6	R521A	7.8	1.6
R497A	7.8	1.6	R522A	7.8	1.6
R498A	7.8	1.6	R523A	7.8	1.6
R499A	7.8	1.6	R524A	7.8	1.6
R500A	7.8	1.6	R525A	7.8	1.6
R501A	7.8	1.6	R526A	7.8	1.6
R502A	7.8	1.6	R527A	7.8	1.6
R503A	7.8	1.6	R528A	7.8	1.6
R504A	7.8	1.6	R529A	7.8	1.6
R505A	7.8	1.6	R530A	7.8	1.6
R506A	7.8	1.6	R531A	7.8	1.6
R507A	7.8	1.6	R532A	7.8	1.6
R508A	7.8	1.6	R533A	7.8	1.6
R509A	7.8	1.6	R534A	7.8	1.6
R510A	7.8	1.6	R535A	7.8	1.6
R511A	7.8	1.6	R536A	7.8	1.6
R512A	7.8	1.6	R537A	7.8	1.6
R513A	7.8	1.6	R538A	7.8	1.6
R514A	7.8	1.6	R539A	7.8	1.6
R515A	7.8	1.6	R540A	7.8	1.6
R516A	7.8	1.6	R541A	7.8	1.6
R517A	7.8	1.6	R542A	7.8	1.6
R518A	7.8	1.6	R543A	7.8	1.6
R519A	7.8	1.6	R544A	7.8	1.6
R520A	7.8	1.6	R545A	7.8	1.6
R521A	7.8	1.6	R546A	7.8	1.6
R522A	7.8	1.6	R547A	7.8	1.6
R523A	7.8	1.6	R548A	7.8	1.6
R524A	7.8	1.6	R549A	7.8	1.6
R525A	7.8	1.6	R550A	7.8	1.6
R526A	7.8	1.6	R551A	7.8	1.6
R527A	7.8	1.6	R552A	7.8	1.6
R528A	7.8	1.6	R553A	7.8	1.6
R529A	7.8	1.6	R554A	7.8	1.6
R530A	7.8	1.6	R555A	7.8	1.6
R531A	7.8	1.6	R556A	7.8	1.6
R532A	7.8	1.6	R557A	7.8	1.6
R533A	7.8	1.6	R558A	7.8	1.6
R534A	7.8	1.6	R559A	7.8	1.6
R535A	7.8	1.6	R560A	7.8	1.6
R536A	7.8	1.6	R561A	7.8	1.6
R537A	7.8	1.6	R562A	7.8	1.6
R538A	7.8	1.6	R563A	7.8	1.6
R539A	7.8	1.6	R564A	7.8	1.6
R540A	7.8	1.6	R565A	7.8	1.6
R541A	7.8	1.6	R566A	7.8	1.6
R542A	7.8	1.6	R567A	7.8	1.6
R543A	7.8	1.6	R568A	7.8	1.6
R544A	7.8	1.6	R569A	7.8	1.6
R545A	7.8	1.6	R570A	7.8	1.6
R546A	7.8	1.6	R571A	7.8	1.6
R547A	7.8	1.6	R572A	7.8	1.6
R548A	7.8	1.6	R573A	7.8	1.6
R549A	7.8	1.6	R574A	7.8	1.6
R550A	7.8	1.6	R575A	7.8	1.6
R551A	7.8	1.6	R576A	7.8	1.6
R552A	7.8	1.6	R577A	7.8	1.6
R553A	7.8	1.6	R578A	7.8	1.6
R554A	7.8	1.6	R579A	7.8	1.6
R555A	7.8	1.6	R580A	7.8	1.6
R556A	7.8	1.6	R581A	7.8	1.6
R557A	7.8	1.6	R582A	7.8	1.6
R558A	7.8	1.6	R583A	7.8	1.6
R559A	7.8	1.6	R584A	7.8	1.6
R560A	7.8	1.6	R585A	7.8	1.6
R561A	7.8	1.6	R586A	7.8	1.6
R562A	7.8	1.6	R587A	7.8	1.6
R563A	7.8	1.6	R588A	7.8	1.6
R564A	7.8	1.6	R589A	7.8	1.6
R565A	7.8	1.6	R590A	7.8	1.6
R566A	7.8	1.6	R591A	7.8	1.6
R567A	7.8	1.6	R592A	7.8	1.6
R568A	7.8	1.6	R593A	7.8	1.6
R569A	7.8	1.6	R594A	7.8	1.6
R570A	7.8	1.6	R595A	7.8	1.6
R571A	7.8	1.6	R596A	7.8	1.6
R572A	7.8	1.6	R597A	7.8	1.6
R573A	7.8	1.6	R598A	7.8	1.6
R574A	7.8	1.6	R599A	7.8	1.6
R575A	7.8	1.6	R600A	7.8	1.6
R576A	7.8	1.6	R601A	7.8	1.6
R577A	7.8	1.6	R602A	7.8	1.6
R578A	7.8	1.6	R603A	7.8	1.6
R579A	7.8	1.6	R604A	7.8	1.6
R580A	7.8	1.6	R605A	7.8	1.6
R581A	7.8	1.6	R606A	7.8	1.6
R582A	7.8	1			

Section 4

Addressing Essential Skills Gaps

As an instructor of adults you are aware of the range of skills that each individual brings to the training classroom. Intake and selection systems can increase or decrease this range. Understanding the needs of learners at each level relative to the Essential Skills requirements of technical training will help you make adjustments in delivery to make training effective for as many apprentices as possible.

This section of the guide provides a description of Essential Skills gaps apprentices typically have at each level. Following the descriptions are strategies for improving the Essential Skills of apprentices.

Essential Skills Level Required in Technical Training

The National Occupational Analysis (NOA) provides the framework for the technical training curriculum. The NOA identifies and groups the tasks performed by skilled workers in specific trades.

A general analysis of the minimum level of Essential Skills required to succeed in technical training shows that most tasks require at least Level 3 in Reading, Document Use and Numeracy. The following two examples from the Carpenter NOA and the Boilermaker NOA list a task and some of the sub-tasks required.

Carpenter

Block A: **Occupational Skills**

Task 3: **Interprets documentation.**

Sub-task: **3.01 Interprets blueprints.**

- 3.01.01 knowledge of types of drawings such as site, architectural, structural and mechanical
- 3.01.02 knowledge of drawing components such as lines, symbols, legends and schedules
- 3.01.03 knowledge of specifications
- 3.01.04 ability to use drawing instruments such as protractors and scale rulers
- 3.01.05 ability to scale imperial and metric measurements

Boilermaker

Block C: **New Construction**

Task 9: **Performs fabrication.**

Sub-task: **9.01 Lays out components for fabrication.**

- 9.01.02 Knowledge of layout methods such as parallel-line, triangulation and radial-line development
- 9.01.06 Ability to perform mathematical calculations
- 9.01.07 Ability to transfer measurements and elevations
- 9.01.08 Ability to verify measurements and tolerances of components

Having a general understanding of the Essential Skills required in technical training helps you to see how learners with Level 1, 2 and even Level 3 characteristics might have challenges with succeeding in their apprenticeship program.

Essential Skills Level 1

Few apprentices enter technical training with only Level 1 Essential Skills. They lack basic foundational skills in reading (e.g. decoding words) and math (e.g. whole numbers, decimals and fractions) required for learning and developing new skills. For these apprentices everything is new. They do not build connections or see relationships in the material they are learning. They are not independent learners and need considerable extra support.

Apprentices at this level are missing many of the underlying Essential Skills required for technical training success. Their skill gaps cannot be addressed during four to eight weeks of technical training as they require considerable time and practice to develop their Essential Skills.

Essential Skills Gaps for Level 1	
<p>Reading and Document Use</p> <p>Apprentices with Level 1 Essential Skills:</p> <ul style="list-style-type: none"> • Are overwhelmed by the amount and difficulty of reading in technical training. • Read the same material over and over without understanding what they read. • Are not able to keep up with the required reading and cannot integrate information from different parts of the text. • Are not comfortable with inferences and want to find the exact answer when they are reading. • Are confused when different words or terms are used to describe or explain similar concepts. • May not be able to cope with familiar types of documents such as lists or tables with limited information. • Do not understand how tables work or how to read drawings or schematics. • Have trouble locating and applying information from different information displays. 	<p>Example</p> <p>Have difficulty with information displays such as complex tables, assembly drawings, prints or schematics.</p>
<p>Numeracy</p> <p>Apprentices with Level 1 Essential Skills:</p> <ul style="list-style-type: none"> • Have not learned basic math foundations. They have not forgotten how to add and subtract fractions; they never learned how to add and subtract them. • Lack the ability to estimate reasonable answers so they are not able to self-correct errors or make a prediction. • Need tasks and applications that are clearly specified with all the necessary information provided to calculate an answer. • Require worksheets with examples that show the steps needed to translate a problem into math operations. • Require worksheets that provide practice with basic math operations. 	<p>Example</p> <p>Have difficulty completing all math applications in technical training.</p>

Essential Skills Level 4 and Level 5

Apprentices with Levels 4 and 5 Essential Skills are independent learners. They are ready to learn trades applications and are likely to be successful in technical training. They have had previous success with learning and can cope with new content and adapt to varied learning environments. Tasks that require integration, inference, analysis and synthesis can be handled by apprentices at these levels.

This group is represented in most apprenticeship classes but not in great numbers. These apprentices will thrive in the technical training setting.

Essential Skills Gaps for Level 4 and Level 5

<p>Reading and Document Use</p> <p>Apprentices with Levels 4 and 5 Essential Skills:</p> <ul style="list-style-type: none"> • Are able to transfer learning from one situation to another and use specialized knowledge. They are able to make connections and can see relationships. 	<p>Example</p> <p>May not be familiar with a specific type of drawing but are able to use what they know from past experience to solve the problem.</p>
<p>Numeracy</p> <p>Apprentices with Levels 4 and 5 Essential Skills:</p> <ul style="list-style-type: none"> • Are quick to remember or learn new operations and trades specific methods of calculation. • Have a strong sense of number concepts and are able to meet the cognitive demands of translation to select the correct operation and locate or estimate the numbers needed for a calculation. Solving complex problems is facilitated by clear steps and repeated strategies. 	<p>Example</p> <p>Can make calculations involving considerable translation with a high degree of speed and accuracy. For example, use geometry, such as bisecting angles and constructing circles from chords, to lay out materials.</p>

Addressing the Essential Skills Gaps

The key to addressing Essential Skills gaps is to understand how the characteristics of apprentices and the skills required to succeed in training relate. Understanding this relationship means you can choose appropriate strategies. There are many strategies that can help apprentices improve their Essential Skills. Integrating these strategies into technical training materials is an effective way to help apprentices improve Reading, Document Use and Numeracy skills.

Below are some strategies that are helpful for most groups with Essential Skills gaps. These strategies can be used with apprentices at all levels.

Reading Strategies

Many apprentices regardless of their Essential Skills level do not spend a lot of time reading. As a result, they may be out of practice. Regulations, standards and codebooks are unfamiliar formats and require some practice. Some strategies for Reading include the following:

- Preview textbooks, codebooks, manuals and other reading material with apprentices:
 - Draw attention to the table of contents, chapter objectives, paragraph headings, glossaries, appendixes and indexes.
 - Have apprentices practice locating information using the table of contents and the index in codebooks, textbooks and manuals.
 - Ask apprentices to predict what they will be reading based on chapter headings.
 - Teach apprentices how to write and use flashcards to learn terms and definitions.
 - Demonstrate using highlighters to highlight key words, main points and other important information.
 - Demonstrate writing page numbers of where answers to questions are found so apprentices can locate the information again easily.
- Give apprentices a purpose for reading:
 - Tell apprentices why they are reading the material.
 - Tell apprentices what they are supposed to know when they are finished reading.
 - Assign questions before reading to give apprentices a focus and purpose for reading.
 - Practice identifying key words in chapter questions and using key words to locate the requested information.
 - Ask apprentices to summarize and compare information.
- Integrate information:
 - Have apprentices practice combining information from several parts of a text or several sources.
 - Demonstrate combining notes on one topic in one place.

Section 5

Integrating Essential Skills into Technical Training

Integrating Essential Skills (ES) into worksheets bridges learning gaps by presenting content material in a way that enhances learning and brings forward the transferable aspects of the skills and content you are teaching. This section shows one strategy for integrating ES to develop or adapt new or existing technical training worksheets.

You are integrating ES when you break a process down into steps, show how to translate a task into a set of calculations, orient an apprentice to the types of information in an information display and locate that information, and provide necessary background or specialized information.

You want to develop worksheets that help bridge the skill gaps that you identified. The examples used in this section illustrate ways to address skill gaps of apprentices who are working at ES Levels 2 and 3.

Developing Essential Skills integrated worksheets is a process that involves making many decisions before you start and also during the actual development of the worksheet. These considerations include planning and developing the worksheets.

Planning and Developing Worksheets

Planning the Worksheets

- 1) Set up the worksheet
- 2) Sequence the worksheets
- 3) Choose vocabulary

Developing the Worksheets

- Flowcharts
- Developing Reading and Information Display-based Worksheets
 - Developing Numeracy-based Worksheets
- 4) Ask questions
 - 5) Provide examples
 - 6) Break down process into steps
 - 7) Use photographs or drawings
 - 8) Include notes when needed
 - 9) Teach a concept when needed
 - 10) Provide detailed answer keys

Examples taken from the trades worksheets will illustrate the stages of planning and developing Essential Skills integrated worksheets. The order of the contents for this section is shown below:

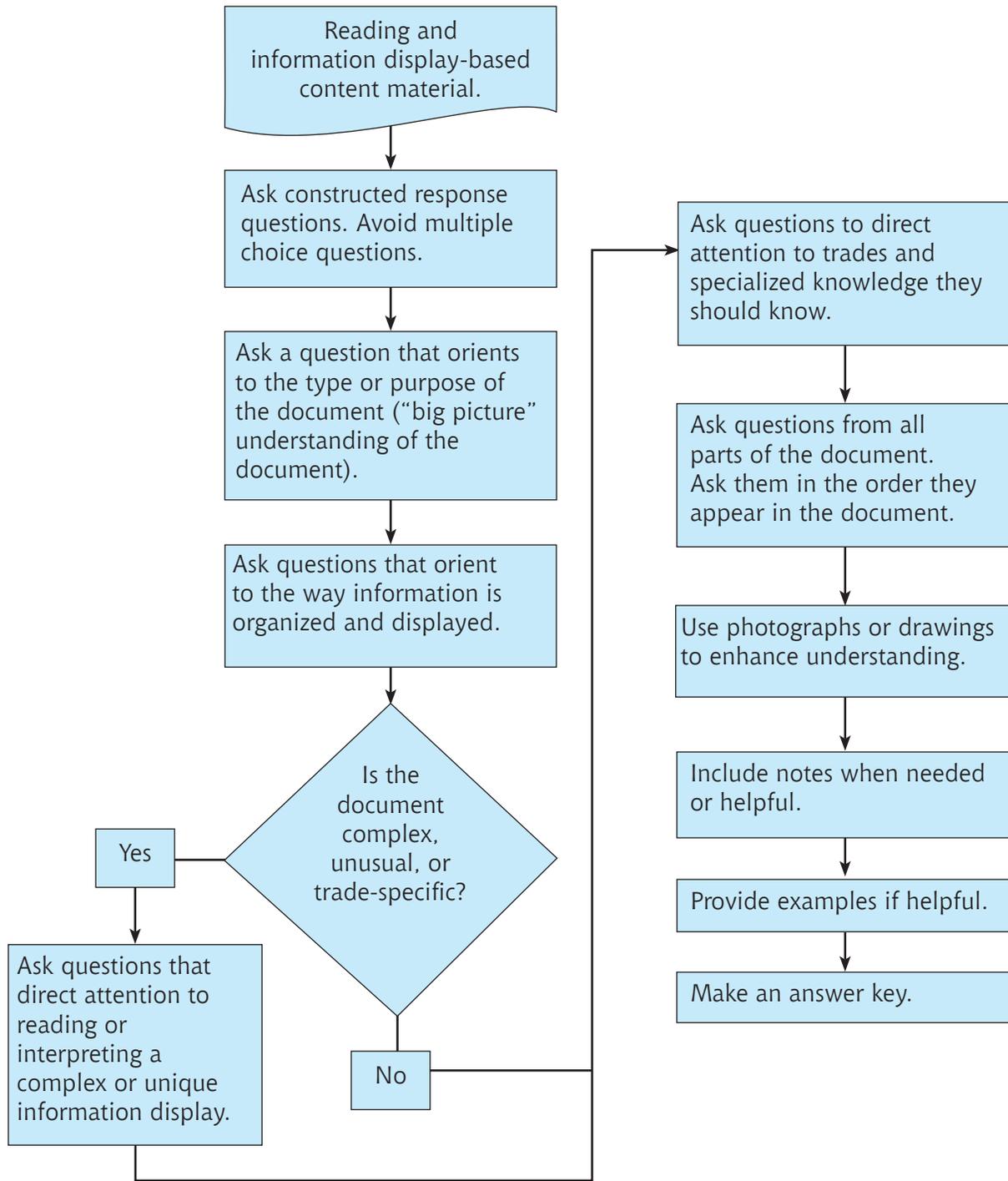
Each of the three stages of **Planning the Worksheets** will be looked at in detail with examples from different worksheets.

After completing the planning process, you are ready to develop a worksheet. There are two flowcharts that outline the process for developing two kinds of worksheets.

Developing the Worksheets has examples for stages of the worksheet development process. Each example comes from a different worksheet and examples do not follow the development of a particular worksheet.

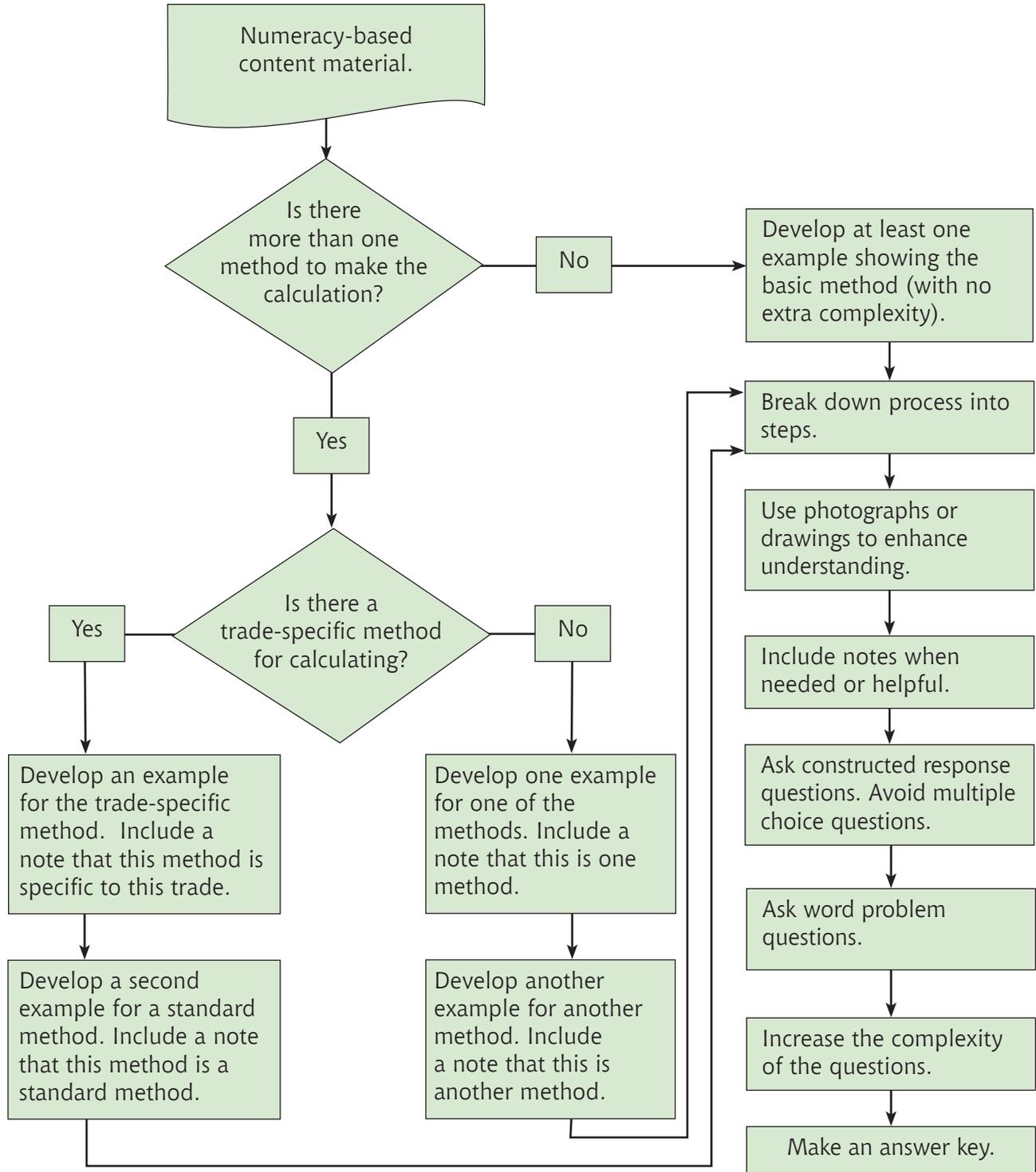
Developing Reading and Information Display-based Worksheets

You have considered all the points in the planning phase and decided that you will develop a reading and/or information display-based worksheet. (Reading: textbook, building codes, etc. Information display: tables, drawings, graphs etc). Now you are ready to develop the worksheet. Use the flow chart to guide you through the process. Refer to the examples for the parts of this process starting on page 52.



Developing Numeracy-based Worksheets

You have considered all the points in the planning phase and decided that you will develop a numeracy-based worksheet (textbook, building codes etc.) that may have information displays (tables, drawings, graphs etc). Now you are ready to develop the worksheet. Use the flow chart to guide you through the process. Refer to examples for the parts of this process starting on page 52.



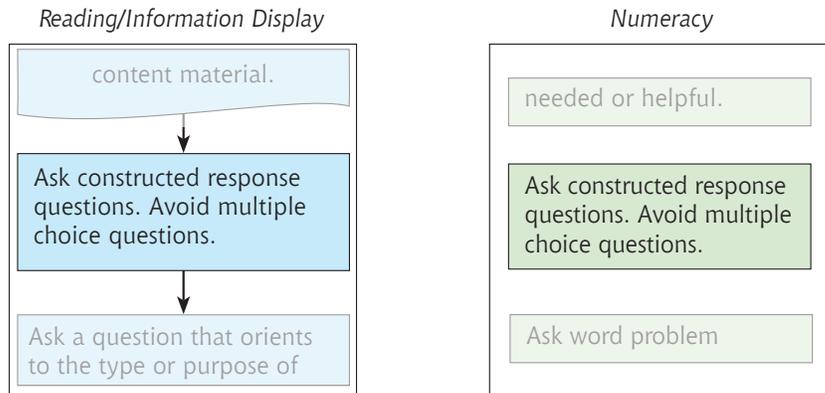
Developing the Worksheets

4) Ask questions

Questions can be used to orient apprentices to different document displays as well as highlight the important content information in the documents. Many examples of ways to use questions are shown below.

Ask constructed response questions

Constructed responses reveal what apprentices know and their thinking processes. With multiple-choice questions, you do not know whether an apprentice knew the answer or guessed it.

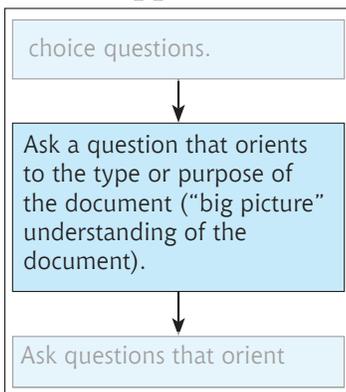


Example

The Before and After questions are the same but for the After question, the apprentice has to locate this information to answer it.

- (Before)
 What is the seismic load (psf) for a wall with brick facing?
 a) 25.5
 b) 45.0
 c) 53.0
 d) 65.5
- (After)
 What is the seismic load (psf) for a wall with brick facing?

Orient apprentices to the type or purpose of the document

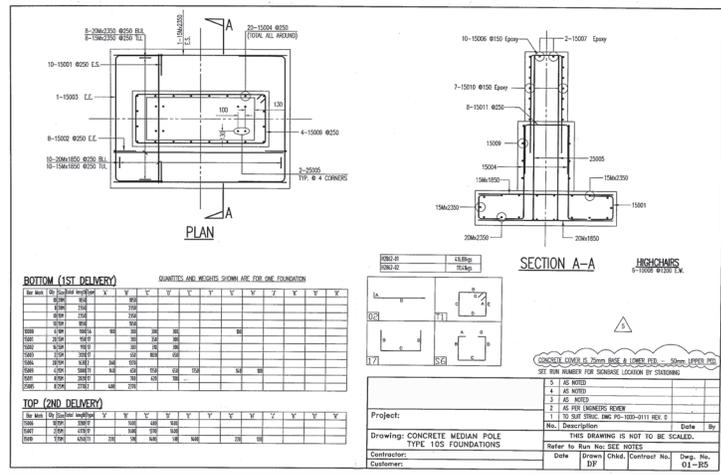


A question that directs attention to the whole document sets the foundation for the questions that follow. This type of question gives the big picture context. Big picture questions might ask for the type, title or purpose of a document.

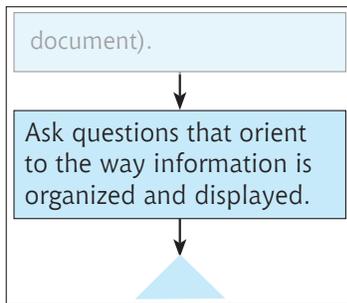
Example

This question orients apprentices to a placement drawing which is unique to ironworkers.

Task
What type of drawing is this?



Orient to the way information is organized and displayed



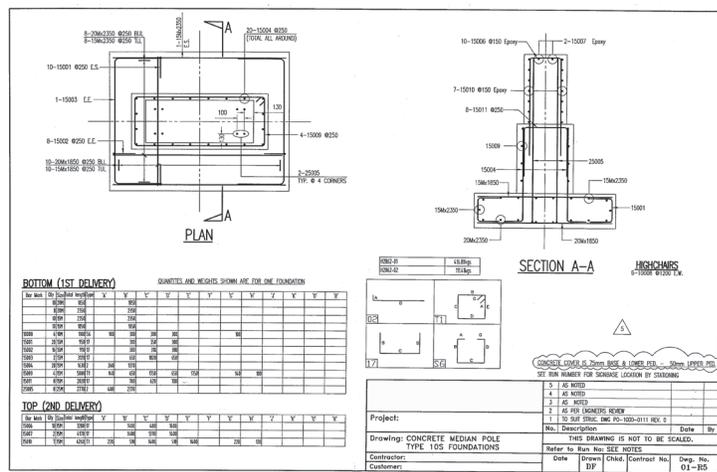
Documents can have information in text, paragraphs, tables, graphs, drawings and other such formats. Abbreviations, symbols and other such representations may also be used instead of words.

Example 1

This question orients to the specialized knowledge that is needed to interpret the drawing.

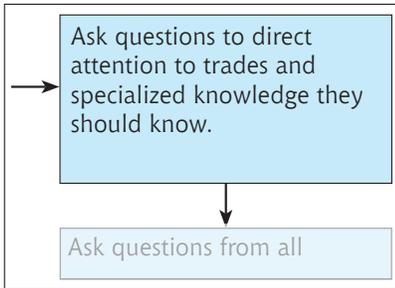
Task
Define the following abbreviations that are used on this drawing.

- a) BLL c) TLL e) TYP g) ES
- b) BUL d) TUL f) EE h) EW



Section 5

Direct attention to trades and specialized knowledge apprentices should know



Example 1

This task directs attention to trade-specific information that was not in the text but found in the diagrams.

Task

What two parts of a fireplace are lined with firebrick?

FIGURE 12-3
Section of a standard fireplace and chimney.

1. Footing
2. Fresh air intake vent
3. Outer hearth and inner hearth
5. Firebox
7. Damper
8. Lintel
9. Smoke chamber
10. Flue
11. Solid masonry
12. Chimney cap

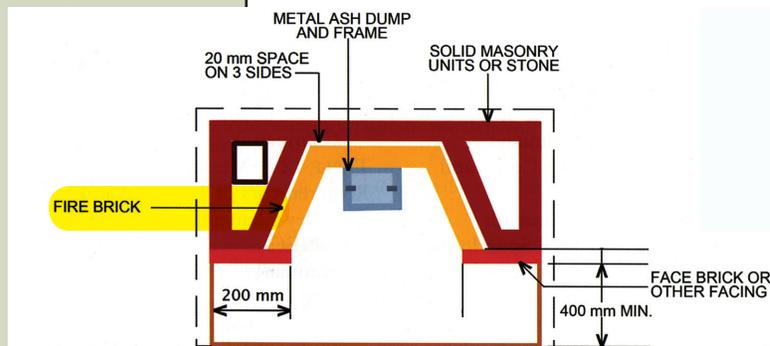
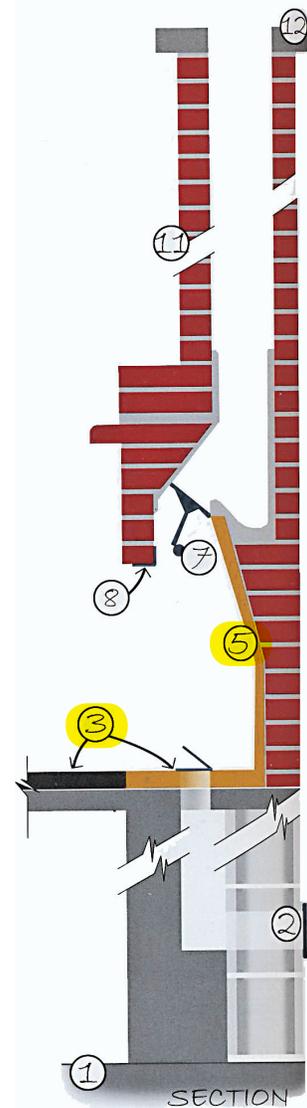
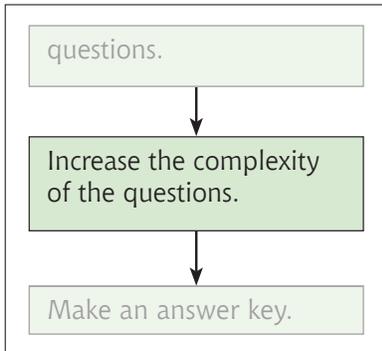


FIGURE 12-2
Plan view of a typical fireplace.



Increase the complexity of questions



Write questions so that each subsequent question increases in complexity.

Example

Added complexity in each question is shown in bold.

Area is given. Calculate the weight.

Area is given. Calculate the weight.
Multiply weight by 15.

Convert inches to decimals of a foot. Calculate the area.
Calculate the weight.

Convert millimetres to metres. Calculate the area of a circle.
Calculate the weight.

Convert inches to a decimal of a foot. Calculate the radius.
Calculate the area of the circle.
Calculate the weight.

Convert feet, inches, and fractions of an inch to a decimal of a foot. Calculate the area of a rectangle.
Calculate the weight.

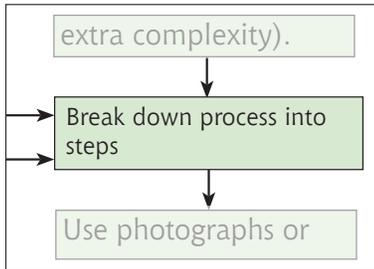
Ironworkers

Practice
Remember: Always draw and label a diagram.

1. Calculate the weight of a steel plate that has an area of 4.5 m² and is 11 mm thick.
- 2) How much does a load of 15 steel plates weigh? Each steel plate has an area of 22.5 ft² and is 5/8" thick.
- 3) Calculate the weight of a steel plate that is 39" square and is 1/4" thick.
- 4) Calculate the weight of a steel plate that has a radius of 1 500 mm and is 15 mm thick.
- 5) Calculate the weight of a steel plate that has a diameter of 39" and is 1/4" thick.
- 6) Calculate the weight of a steel plate that measures 5' 3 1/8" by 4' 6 3/8" and is 5/8" thick.

44 Construction Sector Council SKILLPLAN

6) Break down process into steps



When a process involves more than one action, breaking that process down into steps highlights the transferability of the process and makes the process easier to remember. The steps are “cues.”

Decide on the steps by:

- the number of formulae
- “chunking” steps into logical groupings
- keeping the number of steps low (a memorable and repeatable strategy)
- trial and error: what works and what does not

Example 1

Two formulae are needed to calculate the total length of the trench at the top.

Step 1: The first formula calculates the Horizontal Distance of a slope.

Step 2: The second formula calculates the width of the trench at the top.

Use the same vocabulary as the drawing.

The conversion from a fraction to a decimal is not explained, but is shown to indicate where 0.75 came from.

EXAMPLE: 1
 Calculate the total width of the trench at the top. The slope ratio is ¾:1.

STEP 1: Calculate the horizontal distance (HD).
 $HD = \text{slope ratio} \times \text{work} =$
 $\frac{3}{4} \times 7 \text{ m} = 0.75 \times 7 \text{ m} = 5.25 \text{ m}$

STEP 2: Calculate the width of the trench at the top.
 Width of trench =
 $5.25 \text{ m} + 1.2 \text{ m} + 5.25 \text{ m} = 11.7 \text{ m}$

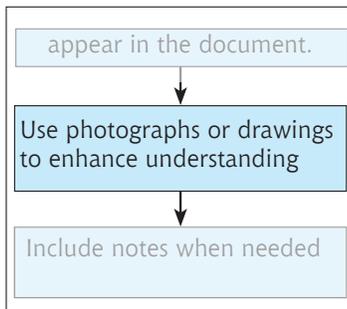
Dotted lines represent the width of the bucket.

Section 5

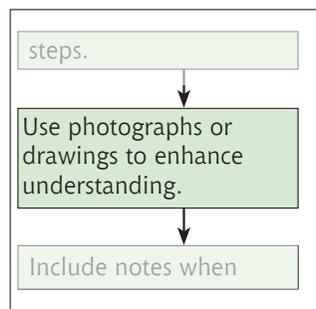
7) Use photographs or drawings

Photographs and drawings can show, explain or teach an item or a concept. Photographs and drawings are concrete and can be “seen” more easily than words. They can be a transition strategy until the concept is understood.

Reading/Information Display

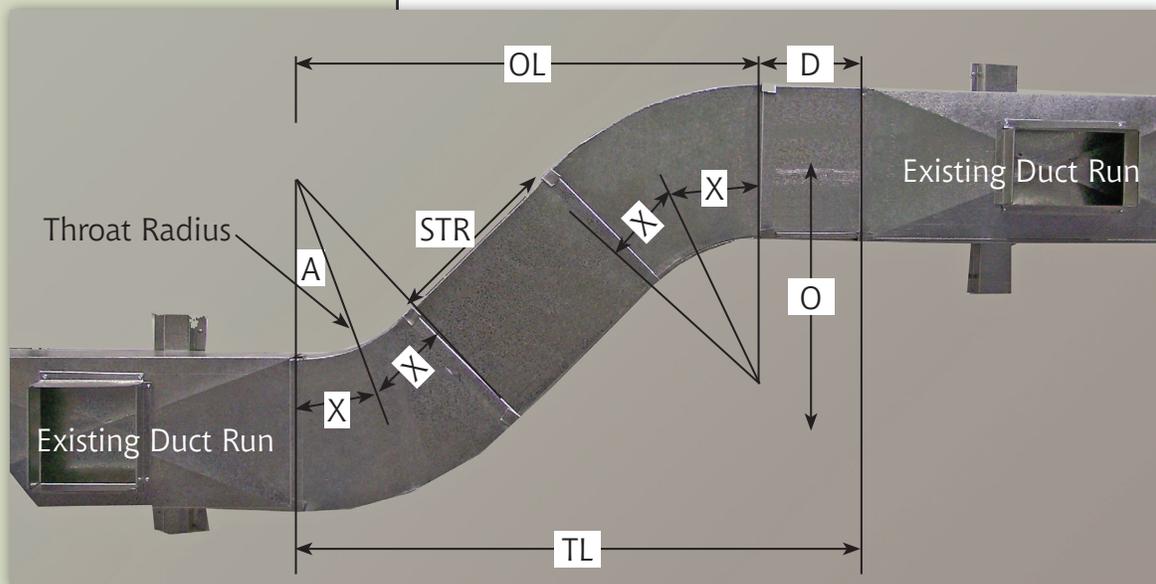


Numeracy



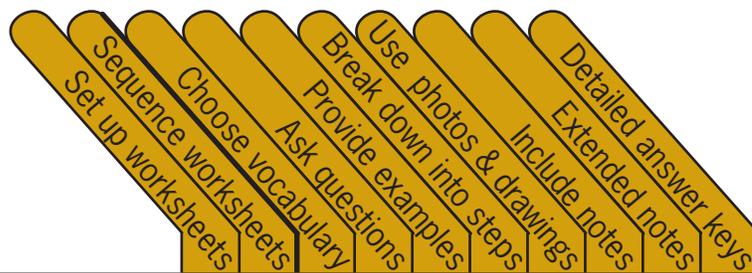
Example 1

This labelled photograph draws attention to the different components that are needed to calculate a given elbow offset. The photograph shows the components more clearly than words would.



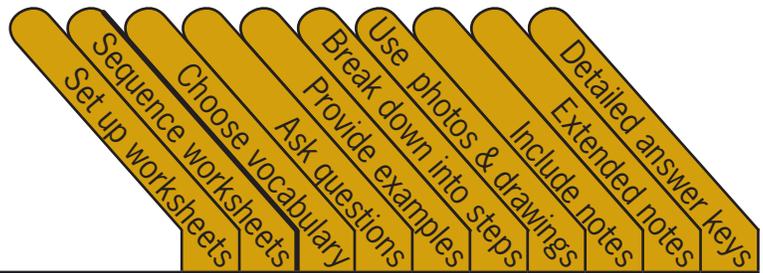
Section 5

Worksheets and their Essential Skills Integrated Strategy



Trade: Worksheet Topic

Trades Worksheets A-G An Essential Skills Approach									
Boilermakers: Calculating Lead Line Pull	•		•	•	•	•	•	•	•
Bricklayers: Textbook Section Review	•			•					•
Carpenters-Scaffolders: Health and Safety Reg	•			•					
Crane Operators: Lifting Capacities RT522	•	1	•	•	•	•	•	•	•
Crane Operators: Elliot 1881 Load Specifications	•	2	•	•					•
Crane Operators: Folding Boom Load Chart	•		•	•					
Floorcovering Installers: Cut Order	•		•	•	•	•	•		•
Glaziers: Trigonometry... Radius Frames 3	•	1	•	•	•	•	•	•	•
Glaziers: Trigonometry... Radius Frames 4	•	2	•	•	•	•	•	•	•
Glaziers: Trigonometry... Radius Frames 5	•	3	•	•	•	•	•	•	•
Glaziers: Trigonometry... Radius Frames 8	•	4	•	•	•	•	•	•	•
Trades Worksheets H-P An Essential Skills Approach									
Heavy Equipment Operators: Trench Width	•	1	•	•	•	•	•	•	•
Heavy Equipment Operators: Swell Factors	•	2	•	•	•	•			•
Heavy Equipment Operators: Volume	•	3	•	•	•	•	•	•	•
Insulators (Heat and Frost): Using Drawings	•		•	•				•	•
Insulators (Heat and Frost): Scale Ruler	•		•	•	•	•	•	•	
Insulators (Heat and Frost): Frustrums	•		•	•	•	•	•	•	•
Ironworkers: Ironworker Blueprint Reading	•		•	•					•
Ironworkers: Calculating Weights Using Area	•		•	•					•
Ironworkers: Estimating Weights of Rebar	•		•	•					•
Ironworkers: Reading Specifications	•		•	•					
Ironworkers: Steel Manual Standard	•		•	•					
Painters and Decorators: Wallpaper	•		•	•	•	•	•	•	•



Trade: Worksheet Topic

Trades Worksheets R-W An Essential Skills Approach										
Refrigeration and AC Mechanics: Fan Laws	•	1	•	•	•			•	•	•
Refrigeration and AC Mechanics: Fan Laws	•	2	•	•						•
Refrigeration and AC Mechanics: B52-05 Code	•		•	•						
Refrigeration and AC Mechanics: Relief Valve	•		•	•	•	•		•		•
Refrigeration and AC Mechanics: Piping size	•		•	•	•	•		•		•
Sheet Metal Workers: Elbow Offset	•	1	•	•	•	•	•			•
Sheet Metal Workers: Straight Duct	•	2	•	•	•	•	•			•
Wall and Ceiling Installers: Engineered Drawings	•		•	•						
Wall and Ceiling Installers: Standards Manual	•		•	•						
Wall and Ceiling Installers: Missing Dimensions	•		•	•						•
Wall and Ceiling Installers: Determining Grid Layout	•		•	•	•	•	•	•		•