



MINISTRY OF TRAINING, COLLEGES AND UNIVERSITIES

Procedures

1. Procedures for the Development of Apprenticeship Curriculum Standards
2. Procedures for the Development of Apprenticeship In-School Exemption Tests

July 2008

July 28, 2008



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**1. Procedures for the Development of
Apprenticeship
Curriculum Standards**

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Standards Development Overview

The Ministry of Training, Colleges and Universities (MTCU) oversees the development of training standards for apprenticeship programs. Apprenticeship is workplace-based training and includes an in-school training component which supports skills development and mastery on-the-job. The competency-based approach is used for standards development. Competency-based training (CBT) is a systematic approach to training which is results oriented and based on specific, precisely stated competencies.

The design process of developing the workplace or on-the-job training standard includes three major activities: occupational analysis; development of performance objectives; and in-school curriculum standards. The design process of developing the in-school component of training includes two major activities:

- development of the curriculum standards; and
- development of exemption tests.

The curriculum standard is developed from the on-the-job training standards. The exemption tests are developed from the curriculum standards.

Inherent throughout the design process is meaningful and substantial participation of all stakeholders. Industry involvement is critical to standards development to ensure that skills training meet industry's present and future needs.

The apprenticeship in-school curriculum standard represents standardized outcomes and learning content that is delivered by all approved training delivery agents (TDAs). Curriculum standards complement the workplace training standards. Learning outcomes reflect what the apprentice must be able to demonstrate upon completion of each reportable subject of in-school training. The training delivery agent (TDA) must be able to deliver the curriculum standards in support of the learning outcomes. A TDA wishing to be approved must demonstrate its ability to deliver the outcomes as grouped in the approved curriculum standard. The approved curriculum forms the basis for the development of lesson plans, and evaluation standards and criteria.

The curriculum standards are composed of required Reportable Subjects.

A reportable subject is:

a clustering or grouping of related or like learning outcomes, units of learning or modules

Please note: The Ministry will not approve a curriculum standard that contains specific workplace and safety-type modules/reportable subjects that are required by law of all employees (e.g., WHMIS, Fall Arrest Systems) and other types of safety-type modules that are not necessarily exclusive/specific to the trade (e.g., First Aid Certification). The safety of all workers is paramount and as such, it is expected that the sponsor/employer will ensure that workers receive all required workplace safety training. Safe trade related work practices should be promoted and reinforced throughout the curriculum standard.

Addendum A is the required Ministry curriculum standards format and that format must be adhered to.

Final approval is the responsibility of the Ministry.

A. Curriculum Standards: Learning Outcomes

MTCU curriculum standards use the learning outcome methodology. Learning outcomes represent culminating demonstrations of learning and achievement. Outcomes are not simply a listing of discrete skills, nor broad statements of knowledge and comprehension. Outcomes describe performances that demonstrate that significant learning has been achieved and applied.

Collectively, learning outcomes outline the skills and knowledge that an apprentice must demonstrate and achieve in order to successfully complete the in-school component of an apprenticeship. Learning outcomes reflect what the apprentice must be able to demonstrate upon completion of each reportable subject of in-school training. The training delivery agent must be able to deliver the curriculum standards in support of the learning outcomes.

Outcomes are developed in concert with all stakeholders: industry and training delivery agents. Using this approach, all stakeholders agree on what may be termed as “the contract/standard” between the trainee and the training delivery agent. Learning outcomes are developed for every, or as appropriate, performance objective defined in the apprenticeship training standard. This includes the General Performance Objectives (GPO) and Performance Objectives (PO). Each outcome has associated performance indicators. Performance indicators are discrete statements that describe the elements leading to attainment of the learning outcome.

The agreed upon learning outcomes are used to develop the apprenticeship in-school curriculum standard.

DEVELOPING LEARNING OUTCOMES

The learning outcome statement sets out the culminating demonstration of learning and achievement that the apprentice must demonstrate.

Learning outcomes are developed for each General Performance Objective and Performance Objective. Outcomes focus on what the trainee will do, describe the result of learning and emphasize how learning is used. The process to developing learning outcomes includes an approach to integrate academic subject matters (e.g., math, science) with work situations.

PROCEDURES FOR DEVELOPING LEARNING OUTCOMES

1. Review the on-the-job performance objective.
2. Begin the learning outcome with the phrase:
“On successful completion, the apprentice is able to...”
3. Follow the phrase with an appropriate verb.
4. Use key words early in the learning outcome.
5. Complete the outcome with the criterion.
6. Include performance indicators at the performance objective level.
7. Ensure that the learning outcome satisfies the criteria:
 - achievable
 - measurable
 - significant
 - appropriate for Prior Learning Assessment and Recognition (PLAR).
8. Avoid writing a learning outcome that addresses several performances at a time.
9. Ensure that the learning outcome does not dictate specific curriculum standards. Learning outcomes must not be drafted so that it limits or dictates content, modes of delivery or methods of assessment.
10. Arrive at a level of specificity that is appropriate to the vocation or program.
11. Ensure that the wording of the learning outcome is clear.

WRITING AN OUTCOME STEP BY STEP:

1. Review the on-the-job performance objective.
2. The learning outcome statement begins with the phrase:
“On successful completion, the apprentice is able to...”
3. Follow the phrase with an appropriate **verb** (see domains of learning). The verb (action) must be at the appropriate taxonomy level.
4. Early in the learning outcome, state the key words that describe the nature of the performance. State the outcome as an end result, not as a process. The statement should be a clear description of what the learner is expected to do with reliability.
5. Complete the outcome with the CRITERION. To what degree or measure must the outcome be performed?

Example Outcome:

On successful completion, the apprentice is able to **recommend repair procedures for anti-lock systems** TO MANUFACTURERS’ SPECIFICATIONS.

6. Performance Indicators are developed for each outcome that is developed at the Performance Objective level only.

Performance Indicators are discrete statements that describe the elements leading to attainment of the learning outcome.

Example Outcome and Performance Indicators:

On successful completion, the apprentice is able to **recommend repair procedures for anti-lock systems** TO MANUFACTURERS’ SPECIFICATIONS.

Performance Indicators:

- identifies the types of anti-lock braking systems;
- interprets schematics and instructions;
- hooks up scan tool;
- interprets scan tool results;
- diagnoses braking system; and
- recommends repair.

Note that each performance indicator begins with a verb. The indicators are sequenced, leading to attainment of the outcome.

7. Does the outcome meet the criteria:

Achievable - represent minimum performance level required for completion;

Measurable - ensure they are not stated too broadly or narrowly so that they are transferable;

Significant - reflects a performance which is essential; and

Appropriate for Prior Learning Assessment and Recognition (PLAR) - encourage those who have learned through other experiences to apply for credit.

DOMAINS OF LEARNING

Learning outcomes may be classified within the domains of learning: cognitive; psychomotor; and affective. Therefore, the most important component of a learning outcome is the verb used to classify its level of complexity.

Domains of Learning:

Cognitive Domain: includes intellectual processes such as knowledge and comprehension. Often referred to as the “thinking” or the “head” area.

Psychomotor Domain: includes physical performance. Often referred to as the “doing” or “hands-on” domain.

Affective Domain: includes values, attitudes, and beliefs. Often referred to as the “feeling” or “heart” area.

In vocational training programs, the focus is mainly in the cognitive and psychomotor domains, although values, beliefs and attitudes are prevalent in occupations where the worker has contact with the public. (Addendum B expands on the categories and activities within the three domains of learning.)

After a number of learning outcomes and performance indicators have been developed, it is recommended that the entire workgroup review the progress as an initial validation. The intent of this step is to ensure that the group agrees on the outcomes and indicators and that the criteria are met: achievable; measurable; significant and appropriate for Prior Learning Assessment and Recognition (PLAR).

Addendum A: Recommended Format

An example of a learning outcome and performance indicators, based on objectives from the Automotive Service Technician Apprenticeship Training Standards, January 2003, is provided in the recommended development format.

On-the-job Training Standard	Learning Outcome
<p>5170.0 General Performance Objective</p> <p>Diagnoses and repairs braking systems by Performing a visual inspection; diagnosing and troubleshooting hydraulic braking systems and components; repairing hydraulic braking systems and components; verifying repair of hydraulic braking systems and components, diagnosing and troubleshooting anti-lock braking systems and components; repairing anti-lock braking systems and components; and verifying repair of anti-lock braking system and components; diagnosing and troubleshooting anti-skid/traction control systems and components; repairing anti-skid/traction control systems and components, and verifying repair of anti-skid/traction control systems and components; measuring and resurfacing brake drums, linings, and rotors, according to manufacturers' recommendations, specifications and safety requirements.</p>	<p>5170.0 Module Learning Outcome</p> <p>On successful completion, the apprentice is able to:</p> <p>recommend repair to braking systems according to manufacturers' specifications.</p>
<p>5170.06 Performance Objective</p> <p>Repair anti-lock braking systems (ABS) and components, including: drums, callipers, rotors, friction materials, backing plates, routing of hoses and lines, valves, master and wheel cylinders, fluids, boosters, accumulators, actuators, switches, solenoids, relays, sensors, rotor sensors, motors, pumps, actuators, reservoirs, reluctors, modules, boosters, wiring harnesses, valves, safety devices, information warning displays, and fastening and mounting devices by exchanging, reconditioning or servicing using hand, power and specialized tools and lifting, rigging and blocking devices according to manufacturers' recommendations, specifications and safety requirements.</p>	<p>5170.06 Learning Outcome</p> <p>The apprentice is able to:</p> <p>recommend repair procedures for anti-lock systems to manufacturers' specifications.</p> <p><u>Performance Indicators</u></p> <ul style="list-style-type: none"> • identifies the types of anti-lock braking systems and components; • interprets schematics and instructions; • hooks up scan tool; • interprets scan tool results; • diagnoses braking system; and • recommends repair.

Addendum B: Domains of Learning

Learning can be categorized into three domains: cognitive; psychomotor; and affective. Each domain is classified in ascending order of difficulty. This classification is called a taxonomy.

Cognitive Domain: includes intellectual processes such as knowledge and comprehension. Often referred to as the “thinking” or the “head” area.

The Interprovincial “Red Seal” Program (see below for description) has collapsed the cognitive domain into three categories:

- comprehension/recall;
- application; and
- critical thinking.

Introduced in 1959, the Interprovincial Standards Red Seal Program is an industry driven certification program recognized by all provinces and territories in Canada. Successful completion of Certificate of Qualification examinations in Red Seal trades enables the candidate to have the Red Seal endorsement affixed to his/her jurisdictional Certificate of Qualification to have their trade credentials accepted by all jurisdictions in Canada.

Categories and activities in the cognitive domain are as follows:

Category	Explanation
Comprehension/Recall	Recalls and understands <ul style="list-style-type: none">– definitions– facts– principles
Application	<ul style="list-style-type: none">– applies procedures to new and practical situations– applies theoretical concepts to new or practical situations
Critical thinking	<ul style="list-style-type: none">– judges the relevancy of data– judges the accuracy of data– interprets data– solves problems– identifies cause-and-effect relationships– formulates valid conclusions

Psychomotor Domain: includes physical performance. Often referred to as the “doing” or “hands-on” domain. Categories and activities in the psychomotor domain include:

Category	Sample Activities
Imitation	Observes and <u>repeats</u> skill
Manipulation	Performs skill according to specifications
Precision	Reproduces skill independently within tolerances
Articulation	Performs several skills in sequence consistently
Naturalization	Completes one or more skills competently and automatically

Affective Domain: includes values, attitudes, and beliefs. Often referred to as the “feeling” or “heart” area. Categories and activities in the affective domain include:

Categories	Sample Activities
Receiving	Attending to stimuli, i.e. listens and shows sensitivity
Responding	Reacting to stimuli, i.e. participates with and shows interest in others
Valuing	Displaying behaviour consistent with belief or attitude, i.e. demonstrates a commitment
Organizing	Commitment to a set of values as displayed by behaviour, i.e. formulates plan based on need
Characterizing	Demonstrates behaviour which is consistent with internalized values, i.e. demonstrates self-reliance, punctuality and self-discipline

B. Curriculum Standards: Reportable Subjects

A reportable subject is:

a clustering or grouping of related or like learning outcomes, units of learning or modules

Develop reportable subjects within the framework of the program's approved in-school duration. There will be no increase to the current approved in-school duration without prior approval by MTCU. For development of new curriculum standards, there is a limit to the duration of in-school training that MTCU is able to support. The duration of the in-school component for new curriculum standards will require approval by MTCU staff. Please work with MTCU staff to achieve agreement on an appropriate duration for your trade or occupation. Ministry approval should be confirmed early in the development process.

For each reportable subject:

1. Develop the reportable subject in learning outcomes: general learning outcome and specific learning outcomes.
2. Identify the reportable subject duration.
3. Identify the total theory and practical hours' breakdown.
4. Identify pre-requisite reportable subjects.

Pre-requisite: This indicates those reportable subjects which must be completed before the current reportable subject is begun.

Note: The system of pre-requisites is the means of sequencing the instructional material of the Curriculum Standard.

5. Optional: Identify the theory and practical hours' breakdown for each learning outcome.
6. Identify the learning content for each specific learning outcome.
7. Identify an evaluation structure that is consistent with the outcomes.
8. Optional: include a section for instructional strategies and delivery modes.
9. Optional: include a section for reference materials.
10. Optional: Identify recommended equipment list.

Format

Refer to Addendum C for the required Curriculum Standard template and sample;. The curriculum standard document includes a “Program Summary of Reportable Subjects” which represents delivery of reportable subjects grouped by level:

- Level 1 (Basic, sometimes will be Common Core)
- Level 2 (Intermediate, sometimes will be Common Core)
- Level 3 (Advanced).

Note: The format must be produced in 12 point Arial.

The document must include an implementation date and, if appropriate, a strategy to accommodate apprentices in transition from an existing curriculum standard version.

VALIDATION

To ensure that industry and all training delivery agents support the new/updated curriculum standard developed by the workgroup, the curriculum standard must be validated/verified by current industry practitioners and other Training Delivery Agencies’ (TDA) representatives. Industry representatives may be identified in consultation with the Industry Committee (IC), Provincial Advisory Committee (PAC) or Provincial Steering Committee (PSC), management and labour associations, ministry and training delivery agency staff. Members of the validation committee must be approved by the Ministry (Program Development Unit).

After the material has been validated, the completed curriculum standard proceeds to the approval process.

CURRICULUM STANDARD APPROVAL PROCESS

Purpose and Scope

The process described herein is for curriculum standard approval for the in-school training portion of Apprenticeship Programs. The approval process is the responsibility of contractor who has developed the curriculum.

Steps

1. Curriculum standard as developed by groups, including Curriculum Advisory Committees (CAC) (as defined by the Heads of Apprenticeship Training - HAT), and/or contractors, will be presented for approval in the format(s) designated in the contract for development. It will be presented for approval to the CAC.

2. Curriculum standard must then be presented to the appropriate Industry Committee, Provincial Advisory Committee or Provincial Steering Committee and approved by that group. Minutes of the meeting at which the approval took place must be available if required.
3. The Project Leader will ensure that all approved training delivery agencies have had an opportunity to complete Heads of Apprenticeship Training impact sheets.

Steps 4 – 6 apply to curriculum being delivered by Colleges of Applied Arts and Technology

4. For revisions of existing curriculum standard, the Project Leader will arrange to have the curriculum standard presented at the next HAT meeting by contacting the Chair of the Committee to have the presentation added to the agenda. New curriculum standards do not require HAT acceptance but are nevertheless presented as an information item.
5. The Project Leader or delegate will present the curriculum standard along with the signed-off impact sheets, and a summary of changes to the HAT members at the scheduled time.
6. HAT members will review the impact sheets and executive summary, and a vote will be held as to whether or not the acceptance of the curriculum standard will be recommended to the Director of Apprenticeship. The vote is duly minuted.
7. The Ministry is notified by the HAT Chair or Project Lead (if non-college deliverers) that the curriculum standard is ready for consideration for ministry approval.

Note: Final approval is the responsibility of the Ministry.

IMPLEMENTATION

Implementation of the approved curriculum standard involves the following:

1. The Ministry is responsible for printing the approved curriculum standard document in English and in French.
2. The Senior Manager, Program Development Unit informs program-approved training delivery agents of the approved curriculum standard and implementation information (date).

TDA's are required to report, to the Ministry, the apprentice's pass/fail grade by Reportable Subject.

Note: Upon receiving Ministry approval, all draft working material must be shredded to ensure confidentiality and security.

(TEMPLATE)

**Apprenticeship or Modular
In-School Curriculum Standard**

**Sheet Metal Worker
Levels 1, 2 and 3**

Program Code or Trade Code: 308A

Ministry of Training, Colleges and Universities

Implementation Date: October 2009

Notes: not for insertion into document:

- *Co-requisites have been removed from shell.*
- *Pre-requisites only are noted at the reportable subject level*
- *Header will name the specific level rather than the levels included in the document (in the instance of one document for all levels)*
- *If a printed document includes more than one (1) level a divider will be used for each level. The divider will be on an odd number page and the reverse will be blank. The next page (Odd numbered) would commence with the “Program Summary of Reportable Subjects” for the one level only. Each Level will commence with its unique the “Program Summary of Reportable Subjects” This would be followed on the reverse side by the boxed page for the Reportable Subject.*
- *Page 1 of curriculum starts with the “Introduction”.*
- *Red text indicates optional or a choice of...eg. ACA or TQAA.*
- *When the document combines Levels the pages will be consecutively numbered*

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S0122.1 Select and Maintain Hand Tools

S0122.2 Select and Maintain Power Tools

S0123 Layout and Drafting

S0123.1 Layout and Drafting Equipment and Applied Geometry

S0123.2 Simple and Straight Line Layout

S0124 Read, Interpret and Produce Drawings

S0124.1 Read Drawings and Specifications to Determine Work to be
Performed

S0124.2 Produce Free-hand Sketches and Drawings to Illustrate to Others
Work to be performed

S0125 Weld and Cut

S0125.1 Cut Ferrous Metals Using Oxy-fuel Techniques

Summary of Recommended Equipment for Level 1

LEVEL 2

Program Summary of Reportable Subjects.....

Introduction

This new curriculum standard for the Sheet Metal Worker **trade or modular** program is based upon the on-the-job performance objectives, located in the industry-approved training standard.

The curriculum is organized into **__levels of training or __ reportable subjects**. The Program Summary of Reportable Subjects chart summarizes the training hours for each reportable subject.

The curriculum identifies only the learning that takes place off-the-job. The in-school program focuses primarily on the theoretical knowledge and the essential skills required to support the performance objectives of the **Apprenticeship or Modular** Training Standards. Employers/Sponsors are expected to extend the **apprentice's or trainee's** knowledge and skills through practical training on the work site. Regular evaluations of the **apprentice's or trainee's** knowledge and skills are conducted throughout training to ensure that all **apprentices or trainees** have achieved the learning outcomes identified in the curriculum standard.

It is not the intent of the in-school curriculum to perfect on-the-job skills. The practical portion of the in-school program is used to reinforce theoretical knowledge. Skill training is provided on the job.

Sheet Metal Worker

Level 1

Program Summary of Reportable Subjects - Level 1

Number	Reportable Subjects	Hours Total	Hours Theory	Hours Practical	Hours Funded (optional)	Hours Practicum (optional)
S0121	Fabricates for Shop and Field	54	42	12		
S0122	Use and Maintain Hand/Power Tools and Shop Equipment	36	24	12		
S0123	Lay-out and Drafting	99	60	39		
S0124	Read, Interpret and Produce Drawings	27	27	0		
S0125	Weld and Cut	24	9	15		
	Total	240	162	78		

Number: **S0121**

Reportable Subject: **FABRICATES FOR SHOP AND FIELD**

Duration: Total 54 hours Theory 42 hours Practical 12 hours

Prerequisites: S0122

Content: S0121.1 Select Materials in the Trade (6/0)
optional

(Optional)

Evaluation & Testing: Assignments related to theory and appropriate application skills
Minimum of one mid-term test during the term
Final exam at end of term
Periodic quizzes

Mark Distribution:

Theory Testing	Practical Application Testing	Projects (optional)	Notebook & Organizational Skills (optional)	Final Assessment
50%	20%	10%	10%	10%

Instructional and Delivery Strategies: (optional)

Reference Materials: (optional)

Recommended Equipment List: (optional)

S0121.1 Select Materials in the Trade

Duration: Total 6 hours Theory 6 hours Practical 0 hours

Cross Reference to Training Standards: 0344.01, 0344.03

GENERAL LEARNING OUTCOMES

Upon successful completion the **apprentice or trainee** is able to select materials used in the trade.

LEARNING OUTCOMES AND CONTENT

1.1 Identify metal characteristics **(3/0) (optional)**

Mechanical Properties, including:

- brittleness
- ductility
- malleability
- toughness

1.2 Select the metals used for appropriate applications **(3/0) (optional)**

Base Metals, including:

- hot/cold rolled steel
- copper
- aluminum
- zinc
- lead

Coated Metals, including:

- galvanized
- satin coat
- tin plate
- anodized aluminium

Alloys, including:

- steel
- brass

1.2 Continued

Material Thickness Gauge, including:

- material gauging
- micrometer
- United States Standard Gauge

Material Weights, including:

- pounds
- ounces

Summary of Recommended Equipment for Level 1

(choose between two - four columns)

- Standard Hand Brake
- Pittsburgh Roll Former
- Spot Welder
- Bar Folder
- Gas Metal Arc Welding Machines & Consumables
- Slip Roll Former
- Button Lock Roll Former
- Groove Seamer
- Gas Tungsten Arc Welding Machines & Consumables
- Ontario Building Code



MINISTRY OF TRAINING, COLLEGES AND UNIVERSITIES

**2. Procedures for the Development of
Apprenticeship
In-School Exemption Tests**

July 2008

Standards Development Overview

The Ministry of Training, Colleges and Universities oversees the development of training standards for apprenticeship programs. Apprenticeship is workplace-based training and includes an in-school training component which supports skills development and mastery on-the-job. A competency-based approach is used for standards development. Competency-based training (CBT) is a systematic approach to training which is results oriented and based on specific, precisely stated and measurable competencies.

The design process of developing the workplace or on-the-job training standard includes two major activities: occupational analysis and development of performance objectives.

The design process of developing the in-school component of training includes two major activities:

- development of the curriculum standards; and
- development of exemption tests

The curriculum standard is developed from the performance outcomes identified in the on-the-job training standards. All content is measured against learning outcomes. The exemption tests are developed from the curriculum standards.

Inherent throughout the design process is meaningful and substantial participation of all stakeholders. Industry involvement is critical to standards development to ensure that skills training meet industry's present and future needs.

Exemption Tests

Policy No. 104 (Client Services Manual): Assessing Prior Learning (In-School), Policy 4.1 states:

An individual may be exempted from some or all of the formal instruction requirements (curriculum standards) for an apprenticeship program by successfully completing ministry-approved exemption tests.

Assessment is the process of measuring performance against a set of standards. Exemption tests represent an assessment to verify successful achievement of the performance stated in the curriculum standards learning outcomes.

The approved curriculum standard is used to develop the exemption tests. The exemption tests are developed for each curriculum standard by level by reportable subject (the level is the predetermined grouping of reportable subjects) as outlined in the approved curriculum standards.

Exemption tests are in the form of multiple-choice items.

Final exemption test approval is the responsibility of the Ministry.

DEVELOPING EXEMPTION TESTS

A. DEVELOP TEST PLAN PER LEVEL

A test plan indicates the distribution of test items amongst the reportable subjects to be tested. Time, the reportable subjects' duration in hours, is the key factor in this calculation. Each test per level will have 100 items.

1. For each level, prepare a table, listing the reportable subjects and their duration in hours. Total the number of hours.
2. For each reportable subject, calculate hours as a percent of total Level hours. This determines the number of test items per reportable subject for a test of a minimum of 100 items. **Note:** Use this calculation to establish the draft test plan. However, the weighting of content areas is a function of the difficulty, importance and frequency of performance of each part of the learning content and not just the number of hours assigned to teach it. Review the draft weighting (by hours) and make adjustments accordingly.
3. 100 items per test are required for an item bank of 2 distinct tests per level.

Example: Test Plan

Reportable Subject	No. of Hours	%	# of Items Required
1	24	10	20
2	42	18	36
3	30	12	24
4	18	8	16
5	42	18	36
6	30	12	24
7	18	8	16
8	36	14	28
Total	240	100	200

* figures rounded

4. Until implementation of exemption tests by reportable subjects, a 70% pass mark will apply overall per level.

B. DEVELOP MULTIPLE-CHOICE ITEMS

1. Develop multiple-choice items based on the reportable subject learning outcomes.
2. Develop sufficient items for each reportable subject per the Test Plan.
3. Develop items to test every learning outcome. The number of questions may not necessarily equal the number of learning outcomes.
4. Develop items at correct taxonomy level (Addendum A).
5. Follow Ministry 'Rules for Multiple-Choice Item Development' (Addendum B). Addendum C is attached for developing items. These sheets are not required by the Ministry and are to be destroyed when the exemption tests are submitted to the Ministry.
6. Prepare an answer key.

VALIDATION OF EXEMPTION TESTS

To ensure that industry and all training delivery agencies can support the exemption tests and test banks developed by the workgroup, exemption tests and test banks must be validated by current industry practitioners and other Training Delivery Agency representatives. Industry representatives may be identified in consultation with the Provincial Advisory Committee, Industry Committee or PSC, management and labour associations, ministry and training delivery agency staff. Members of the validation committee must be approved by the Ministry (Program Development Unit).

Upon acceptance by the validation committee, one or more training deliverers that offer the curriculum standards shall validate all levels of the test ideally on apprentices that are at the final stage of their level of in-school. Preferably, a minimum of 8 apprentices at each level is to be sampled. The final report to the Ministry must include the in-school mark for the period and the exemption test results. After the material has been validated, it is submitted to the Ministry for final approval.

The following section provides detailed information on the validation process, to ensure that the exemption tests are properly constructed.

Overview

The foundation of the Exemption Test is the Curriculum Standard. This Standard describes the in-school training required to support the performances done on the job that are identified in the Training Standard. The Curriculum Standard describes Learning Outcomes which are specific statements of the expected in-school performances to be assessed and the detailed Learning Content within each Learning Outcome. The Exemption Test items are based on the Learning Content and must correspond to the level of detail and depth of understanding intended by the description. Thus the test items tie back to the Curriculum Standard and ultimately to the on-the-job Training Standard.

Validity is a characteristic of a test item or a test. ***A valid test or test item is one that measures what it was designed to measure.*** A test that is designed to measure the basic knowledge and mental skills of an apprentice, and actually does that, is said to be valid. Carrying out the set of practices described in this section will assess the validity of Exemption Tests. These procedures comprise a *content validation* and a *criterion validation* of the test.

There are two types of tests, norm-referenced and criterion-referenced. The norm-referenced test measures the performance of a student in relation to the performance of other students who take the same program. These are the tests for which most common statistical test /item analyses are designed. The tests which are developed for the measurement of criterion performances are named criterion-referenced tests. The Exemption Tests are *criterion-referenced* and the criteria referred to are described by the Learning Outcomes found in the Curriculum Standard. The determination of the validity

of these tests is based less on statistics and more on the method of construction of the test.

Test Plan Development and Validation

The Test Plan sets out the content of the test. It identifies:

- the number of items;
- the curriculum standards content that will be tested;
- the weighting of content areas on the test (which is a function of the difficulty, importance and frequency of performance of each part of the learning content and not just the number of hours assigned to teach it). Generally, the more important and difficult the learning material is, the more items assigned to it;
- the sequence of presentation of the items;
- the section headings for the test which are Reportable Subjects comprising a number of Learning Outcomes;
- the correct answers.

As each of these aspects of the Test Plan is intentionally and judiciously addressed, this will constitute a “Content Validation” of the test. The criteria for developing the test are drawn from this plan and the developer must ensure that:

- each Learning Outcome specifically ties back to the Training Standard for the trade.
- there is enough detail in the Curriculum Standard Learning Content to identify the depth (difficulty) of the items to be developed.
- the breadth of the learning content is represented fairly in the test.
- within each learning content area, the difficulty of the items developed is the same.

Test Item Development and Validation

The general rules for test item development are described in Addendum B. Those practices which increase item validity are as follows:

1. Ensure that the items test all the knowledge and skills they are supposed to test.
2. Ensure that the items test only the knowledge and skills they are supposed to test.
3. Ensure the depth of the items reflects the difficulty, importance and frequency of performance of the skills and knowledge.
4. When developing items, ensure that the questions can be tied back to specific learning content.

Test Trial and Scoring

If the test plan is valid and the items are selected in accordance with it, the test should be valid. However, there is always room for improvement and these may only show up after the test is given to a sample group of apprentices or students. Following are guidelines for the validation of the test:

1. The students in the test group should accurately reflect the population of students who normally complete the Level of in-school training. The test group should comprise:
 - members with an appropriate distribution of in-school performance as measured by other test criteria (i.e. both better and worse students);
 - either apprentice or fee payer students as long as they have taken the same Level course;
 - a mix of apprentices from at least two training delivery agencies and, if possible, two different deliveries at each agency (where applicable).
2. Confirm that all students participating have taken the Level training which is identified in the Curriculum Standard on which the test is based.
3. Replicate the conditions under which the test would be given to exemption test applicants.
4. Score the test so that the student result on each section of the test (i.e. each Reportable Subject) is preserved.
5. When the test is completed, it is often a good idea to have an informal discussion of the test and its impact with the students. Asking about difficult items, getting general impressions and even scoring the test with the students to get detailed feedback will give you a good sense of the test quality. **Make sure you provide a good briefing on test item security and confidentiality.**
6. At a minimum, determine the performance of the entire group on each item (the number selecting the correct answer and each distractor (incorrect option) expressed as either a raw score or a percentage of the group). If available, include other statistics. [NOTE: You may see a *Reliability* measure in the statistics for the test. Reliability is the degree to which a test provides the same result each time it is given. Most reliability assessments assume that you are testing one narrow field of knowledge or mental skill. Since the exemption test is comprehensive, with many different kinds of knowledge, the statistic is not as likely to produce a strong measure of reliability. Remember this when weighing the significance of the result.]

Exemption Test Validation Review Template

Trade: _____ In-school Level: _____ Version: _____

Schools participating: _____

Number of Students Tested: _____ Percent of group: $\geq 70\%$ _____ $\leq 69\%$ _____

Average Score All Students: _____

Pearson Correlation between Level performance and Exemption Test performance:
 $r =$ _____

Item No.	OPTIONS (Correct answer = *)				ASSESSMENT (See Validity Report Data Development section for help)
	A	B	C	D	
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
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24.					
25.					
26.					
27.					

Item No.	OPTIONS (Correct answer = *)				ASSESSMENT (See Validity Report Data Development section for help)
	A	B	C	D	
28.					
29.					
30.					
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63.					
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66.					
67.					
68.					

Item No.	OPTIONS (Correct answer = *)				ASSESSMENT (See Validity Report Data Development section for help)
	A	B	C	D	
69.					
70.					
71.					
72.					
73.					
74.					
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99.					
100.					

[Trade Name and Level] Exemption Test

Test Review Action Report
(Date)

Submitted to: **Ministry of Training, Colleges and Universities**
Programs Branch
23rd Floor, Mowat Block
900 Bay Street, Toronto M7A 1L2
Attn: (Program Coordinator)

Question Number	COMMENTS	Action Taken

Contact: Name:
College:
Tel:
Fax:
Email:

SUBMISSION OF TESTS TO THE MINISTRY

1. For each reportable subject (grouped by levels), produce two (2) tests from the test bank based on the test plan in electronic form. The two exemption tests per level must be print ready on disc or CD-Rom. Each exemption test is to be sub-divided and headed by the name of the reportable subject.
2. An answer key for each exemption test on disc or CD-Rom.
3. A test key for each exemption test containing the following information:

Question Number	Response	Reportable Number	Learning Outcome Number	Taxonomy Level	Diagram Number	Reference (If applicable, i.e. as per National Code Book, Chapter 8, Section 3.2)

4. Tests must be submitted to the Ministry in a way that ensures test security/confidentiality. Tests must be submitted in one of the following ways unless otherwise arranged with the Ministry contact:
 - By courier to a prearranged contact at the Ministry in a sealed envelop/package.
 - By personal exchange involving a representative of the developer and the Ministry contact.
 - By e-mail using password protection to the Ministry contact.
5. Tests and supporting documents must be in Word 2003, Arial font, 12pt size. All diagrams must be submitted in a Corel Draw compatible format. For example, drawings created in Auto Cad must be saved with either a **.dxf** or **.dwg** or **.jpg** file extension. Documents should be editable by Ministry staff, and must **not** be saved with "Read Only" status.

IMPLEMENTATION

Implementation of the exemption tests involves the following Ministry initiatives:

- Facilitate printing of the exemption tests.
- Announce availability of tests and implementation directions.
- Arrange and coordinate distribution of tests.
- Ministry examination security protocols to be applied for exemption tests.

Note: Upon receiving Ministry approval, all draft working material must be shredded to ensure confidentiality and security.

Addendum A: Taxonomy

The following taxonomy levels are in keeping with the Interprovincial Red Seal program:

<p>Level 1: Knowledge/Recall Recalls and understands</p> <ul style="list-style-type: none"> - definitions - facts - principles
<p>Level 2: Procedural/Application</p> <ul style="list-style-type: none"> - applies procedures to new and practical situations - applies theoretical concepts to new or practical situations
<p>Level 3: Critical Thinking</p> <ul style="list-style-type: none"> - judges the relevancy of data - judges the accuracy of data - interprets data - solves problems - identifies cause-and-effect relationships - formulates valid conclusions

The following table provides examples of verbs used in the taxonomy levels:

Taxonomy	Example of Verbs*
Comprehension/Recall	Describe, label, identify, name, state, locate, define, outline
Application	Operate, demonstrate, compute, solve, use, modify, relate, predict, manipulate
Critical thinking	Analyze, classify, devise, synthesize, judge, compare, evaluate, criticize, troubleshoot, diagnose

* Note: These are example verbs. Care must be used not to assume that the classification of verbs is fixed. On the contrary, verbs can be classified into any 2 or 3 taxonomies depending on the application, e.g., the verb "identify" may be recall process; or it may require a critical thinking process.

TAXONOMY EXAMPLES

LEVEL 1: **Recall/Comprehension**

If you “know” or “recall” it, it is level 1 taxonomy, such as:

- definitions
- facts
- principles

Q. What is Benomyl?

- A. Fungicide.
- B. Insecticide.
- C. Growth retardant.
- D. Miticide.

Q. What is a riser?

- A. The highest timber on a retaining wall.
- B. A nipple to which a sprinkler is attached.
- C. A fast-growing perennial which does not require pruning.
- D. An abutment used as a bridge support.

LEVEL 2: Procedural /Application

If you “do” it, it is level 2 taxonomy, such as:

- apply procedures to new or practical situations
- apply theoretical concepts to new or practical situations
- demonstrate understanding of material, ideas, facts, theories

Q. When felling a large stem, what material should be used for the felling pad to prevent turf damage?

- A. Blocks of wood and brush.
- B. Wood chips.
- C. Brush and bull ropes.
- D. Tarps.

Q. When transplanting stock to a heavy soil, what must a horticulturist do to provide correct moisture conditions?

- A. Allow a constant slow trickle of water from a hose, allowing drainage periods.
- B. Water heavily at planting, then keep moist, allowing drainage periods.
- C. Water to saturation daily for first two weeks.
- D. Saturate at planting and check every second week.

LEVEL 3: Critical Thinking

If you “solve” it, it is level 3 taxonomy, such as:

- judge relevancy of data
- judge accuracy of data
- interpret data
- solve problem
- identify cause-and-effect relationship
- formulate valid conclusions

Q. A horticulturist is treating iron chloris with a foliar iron chelate treatment. The manufacturer’s recommended mixing rate is 2.4 kg. of iron chelate in 1,000 litre of water. How much iron chelate is required to mix 250 litre of solution?

- A. .06 kg
- B. .6 kg
- C. 1.2 kg
- D. 2.4 kg

Q. In a circuit the resistance is 3Ω and the current is 2A. What is the voltage drop across the load?

- A. 2 V
- B. 5 V
- C. 6 V
- D. 8 V

Addendum B: Rules for Multiple-Choice Item Development

The statement-question part of the multiple-choice item is called the “stem”; the potential answers, the “responses”. Among the responses, the incorrect ones are referred to as “distracters”.

The following “**DO**” and “**DO NOT**”s are intended to show preferable practice.

DO

1. Ensure that all relevant information to determine the correct response is contained within the stem;
2. Create items that are short, concise and relevant;
3. Use a complete statement/question as the stem;
4. Assess one central or main problem per item;
5. Use a positively phrased stem;
6. Use four responses per item;
7. Provide a response that is absolutely correct;
8. Provide distracters with an element of plausibility in them, but are incorrect. Distracters are intended to “distract” the unknowledgeable;
9. Provide responses which are similar in grammatical structure and approximate length;
10. Arrange numeral responses in ascending or descending order;
11. Rotate the position of the correct response from item to item. Developers have a tendency to use “c” as the response more often than other response options;
12. Test more than recall - include comprehension, interpretation, application, analysis, synthesis and problem-solving;
13. Write in current trade language;
14. Mark or label diagrams and illustrations clearly;
15. Ensure that there is enough time to complete the test.

Do NOT

1. Use an incomplete statement as the stem because it places an unfair reading burden on the apprentice;
2. Use a negatively phrased stem and responses, e.g., “not”, “never”;
3. Provide a clue in the stem to the correct response;
4. Give a series of responses in which two or more choices are correct: e.g., (a) 1 and 2, (b) 1 and 3, and (c) 1, 2 and 4 are correct;
5. Use “All of the above” or “None of the above” as distracters.
6. Use responses that overlap;
7. Use distracters which are obviously wrong;
8. Include responses which are not parallel in grammatical structure;
9. Vary appreciably the length of the responses;
10. Use incidental detail in the correct response;
11. Base a question on trivial information merely because it lends itself to an easily constructed question;
12. Develop one question that is dependent on the solution of another question;
13. Set a recognizable pattern in the order of correct responses;
14. Use specific perimeters, e.g., “always”, “never”, “all” and “generally”;
15. Use reference to manufacturer-specific, patented products; and
16. Develop items which provide clues to the answers in other items.
- *17. Develop items which ask for definitions of acronyms, as they are impossible to effectively translate. *NEW
- *18. Develop items which focus on English grammar as they are inappropriate and impossible to effectively translate. *NEW

Addendum C: Example Format

<p>Item Stem: What is the next step after repairing the first fault of a multiple anti-lock braking system malfunction identified by the scan tool?</p>
<p>Responses:</p> <p>A. Proceed with the second identified fault repair.</p>
<p>B. Reset the system control and retest the scan tool.</p>
<p>C. Road-test vehicle for efficient brake operation.</p>
<p>D. Consult with schematic for second fault repair.</p>

<p>Correct Response: B</p>	<p>Reportable Subject: # 6 Braking Systems</p>
<p>Taxonomy: Level 1 <input type="checkbox"/> Level 2 <input checked="" type="checkbox"/> X Level 3 <input type="checkbox"/></p>	<p>Terminal Performance Objective: # 4005.17</p>
<p>Diagram: Yes <input type="checkbox"/> No <input type="checkbox"/></p>	<p>Item Number:</p>

<p>Developed by: John Doe (Date) March 26, 2000</p>
<p>Keywords: anti-lock braking system, scan tool</p>
<p>Reference:</p>

Addendum D

Code/Code: xxx

Issue/Edition: xx

Book/Livre:

**CONFIDENTIAL
CONFIDENTIEL**

EXEMPTION TEST NAME English

TEST francais

[year]

Exemption Test Name

This test consists of 100 questions.

A pass mark of 70% is required for this test. A pass mark is 70 or more correct answers.

YOU HAVE 3 HOURS TO COMPLETE THIS EXEMPTION TEST.

WARNING

1. DO NOT TALK to other candidates.
2. Only the use of materials provided is authorized.
3. The return of all issued materials to the administering officer is mandatory.
4. The failure to comply with these instructions will result in your disqualification.

INSTRUCTIONS

The candidate is expected to read and abide by the following guidelines prior to responding to the questions of this test.

- I. DO NOT WRITE IN THIS BOOK.
- II. All questions should be attempted.
- III. This test consists of items having multiple choice responses. For every item, there is only one correct answer. Enter the responses of your choice on the answer sheet provided.
- IV. Fill in the personal information requested in the central portion of our answer sheet. DO NOT mark your answer sheet until the administering officer gives you the signal to start.
- V. Your answer sheet will be read by an optical reader. This process requires your cooperation.

Using the type H pencil provided, indicate your correct answer by placing a dark mark on your answer sheet within the confines of the space allotted to the letter (A, B, C or D) you have chosen as the correct answer. Otherwise the reader could register an incorrect answer. Should it be necessary to erase a mark, remove it completely before marking another choice. Do not make another mark (question mark etc.) on your answer sheet. Failure to do so may cause the reader to register a wrong answer.

EXAMPLE

201. What is the capital of Canada?

- A. Halifax
- B. Ottawa
- C. Montreal
- D. Vancouver

201. A B C D
 ○ ● ○ ○

[exemption test section breakdown, # items per section]

[Exemption Test Name]

Section No.	Reportable Subject	No. of Questions	Percentage

Special Instructions

e.g., code book, use of calculator

[Reportable Subject Name]

[Start each subject on new page and identify name. Test numbers are to continue in sequence.]

1. Xxx question?

- A.
- B.
- C.
- D.

2.