

TRADING UP:



Getting Ready
for a Hairstyling
or Electrical
Apprenticeship Program

A project funded by
The National Literacy Secretariat



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“The man (or woman) who can make hard things easy is the educator.” Ralph Waldo Emerson

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Project Summary

The goal of the *Assessment of Apprenticeship Candidates Project* is to adapt the existing Project READ *LBS Referral Assessment* package for use with two identified apprenticeship trades in co-operation with the appropriate industries and the members of the Project READ LCPP Committees.

This project is intended to be a supportive addition to our *Workplace Literacy Co-ordination Pilot*, which seeks to promote literacy and basic skills both in the workplace and for the workforce. The new assessment tool will enhance our ability to effectively promote the LBS system and illustrate the five levels of learning outcomes, in addition to strengthening our ties with employers and meeting their need to screening potential apprenticeship candidates.

The objectives of this project are to:

- research the apprenticeship system, its entry requirements, existing pre-testing, and enrolment procedures for apprenticeship candidates;
- contact all advisory partners for input regarding targeting of trades, establishing an effective liaisons, and adaptation of the assessment package;
- identify two target industry sectors that utilise an apprenticeship system and are experiencing or predicting potential demand for apprentices;
- research and gather authentic materials and samples for inclusion into the assessment package; and,
- pilot and evaluate the assessment tools within the LBS program.

The Assessment of Apprenticeship Candidates package includes two sets of demonstrations that are authentic, sector-specific examples of tasks that apprentices would be expected to perform on the job. Each set represents one of the two selected trades, and focuses on the communications and numeracy skills required by that trade at all five LBS levels. The assessment tools themselves contain all the information that practitioners will need to administer the demonstrations.

This report outlines process we used to select the trades and the demonstration activities, as well as a review of the target audience and a description of the demonstration format.

Selection of Trades

Preliminary Research Phase

In the initial phase of this project, we conducted research into the apprenticeship program, and the needs of apprenticeship candidates in terms of literacy and basic skills. Adults considering an apprenticeship program require two different types of literacy and basic skills: those used on the job, and those that are required for the classroom. Although the majority of an apprentice's time is spent using the more practical on-the-job skills, the need for more academic skills is apparent when they enter the classroom phase of training. These two sets of skills are sometimes incongruent, and many candidates face challenges when they enter the classroom. LBS learners in particular need to develop both types of skills in order to be successful.

Next, we investigated the academic entry requirements for apprenticeship programs. Apprenticeships are governed by two distinct pieces of legislation in the province of Ontario: the Apprenticeship Certification Act (ACA) and the Trades Certification and Apprenticeship Act (TQAA). The ACA covers all trades except construction. Most of these trades require a grade twelve education and/or a secondary school diploma or equivalent.

The TQAA, on the other hand, governs the construction trades, and lists the entry requirements for those trades as anywhere from grade eight to grade ten. Despite the fact that the TQAA has lower entry requirements, however, experts in the field note that apprenticeship candidates really require literacy and basic skills at a much higher level, as well as job-specific skills and knowledge at the grade twelve level.

Contacts at both the Apprenticeship Branch and the construction trade noted that although the entry requirements for construction apprentices are, for the most part, lower than grade twelve, candidates are expected to participate in classroom training at the community college level. The academic skills that a candidate needs to be successful at this level, particularly in science and math, are skills that they would normally acquire in a secondary school curriculum.

In addition, rapid advancements in technology demand that all apprentices and journey persons constantly upgrade their professional skills. This will involve a process of lifelong learning and job-specific training at an advanced level. In order to compete, individuals will require the academic skills necessary to participate in periodic upgrading programs.

Finally, the trades themselves are anxious to recruit individuals who are secondary school graduates. This, in the opinion of spokesmen for the trades, will enhance the profile of journey persons, as well as the trades themselves. For this reason, many training programs, such as those offered by the International Brotherhood of Electrical Workers, require that apprentices have acquired a secondary school diploma or equivalent *before* entering their training program.

LBS learners who do not possess a secondary school diploma will obviously need to meet this requirement if they wish to enter an apprenticed trade, either through completing a secondary school credit program or a secondary school equivalency. Therefore, these learners will need to gain the academic skills required for a secondary school program or equivalent before they attempt to enter an apprenticeship program. But, many LBS learners have already graduated from secondary school, and still lack the literacy and basic skills they need to meet the hands-on and classroom requirements. For this group of learners, it is essential to develop both kinds of skills before they enter an apprenticeship program regardless of the trade they choose.

The next phase of research involved examining the specific literacy and basic skills required for success both on the job and in the classroom. We decided that the Evaluating Academic Readiness for Apprenticeship Training (EARAT) test and the Test of Workplace Essential Skills (TOWES) would serve as ideal benchmarks for the academic and practical skills needed for apprenticeship programs.

The EARAT is an assessment process that helps potential trainees decide if they have the appropriate *academic* skills need for the *in-school* portion of apprenticeship training in specific trades. The tests consist of a number of documents, and asks the trainee to answer multiple choice questions based on the skills and knowledge required for the particular apprenticeship.

TOWES, on the other hand, is an assessment tool that tests a learner's literacy and numeracy skills in tasks associated with the workplace. The test content is based on documents actually used in the workplace. Responses mimic the types tasks that would be expected in a workplace setting.

If a candidate could successfully complete the TOWES and EARAT for his/her chosen trade, it would be safe to assume that the required literacy and basic skills had been acquired.

However, after examining a selection of EARAT tests, it became apparent that the literacy and basic skills required for success far exceeded the skill level that learners in LBS programs normally acquire. This would mean that the LBS learner would need to achieve a minimum of level five in reading and numeracy skills, and then participate in further education in these and other job-specific skills (like sciences and technology) before attempting to enter an apprenticeship training classroom.

Therefore, our project would focus on the academic skills necessary to achieve success at LBS Level 5 *only*.

Finally, we conducted a scan of all the apprenticeship programs offered in the province of Ontario, to determine which two of these trades would be most appropriate for this project. In order to narrow the range of trades that we would consider, we developed selection criteria. Table 1 lists the criteria for the selection of trades.

Table 1: Criteria for the Selection of Trades

Criteria for the Selection of Trades
<ul style="list-style-type: none">• Labour market information reports good prospects to 2005• Changes in educational requirements for entry to specific apprenticeship programs• Number of LBS learners expressing an interest in a particular apprenticeship program

Researching the Demand for Trades

First, we decided that the two trades selected had to have reasonably good prospects for employment once the candidates had completed apprenticeship training. We recognised that this would be a long-term goal for many LBS learners, and that working towards this goal would involve a substantial investment of time and energy on the learner's part. For this reason, we wanted to select trades that would give apprenticeship candidates a reasonable chance of employment, once they had achieved certification.

We used two different documents for this purpose: the *HRDC Ontario Job Futures 2000* report and the Waterloo-Wellington Training and Adjustment Board's (WWTAB) *Environmental Scan for 2001/02*. Ontario Job Futures is a publication that provides information on the current trends and future outlook for 157 occupations that are common to Ontario. The publication is a joint effort between the Province of Ontario and the Government of Ontario.

The WWTAB Environmental Scan is a report that provides updated and concise information related to the labour market, training, and adjustment environment in the Waterloo/Wellington region. The scan analyses the demand for, and supply of, labour in the training board area.

Both of these documents provide information about which occupations have the best prospects for employment; over a five-year period in the case of Ontario Job Futures, and over the next year, in the case of the Environmental Scan. We also felt that by examining *Ontario Job Futures 2000*, we would have a *province-wide view* of job prospects, which would mean that the assessment tools we developed would have a broader range of applicability and allow mobility for learners in Waterloo/Wellington.

We narrowed down the possibilities by focussing first on those occupations that *Ontario Job Futures 2000* listed as having *Strong* or *Good* job prospects to 2005.

Table 2: Trades with **Strong** or **Good** Prospects according to Ontario Job Futures

Trade	Prospects	Trade	Prospect
Aboriginal ECE Worker	Good	Industrial Mechanic Millwright	Good
Auto Body Repairer, (BR. 1, 2)	Good	Industrial Woodworker	Good
Automotive Painter	Good	Marine Engine Mechanic	Good
Baker	Good	Mould Maker	Strong
Bearings Mechanic	Good	Optics Technician	Good
Brick and Stone Mason	Good	Pattern Maker	Strong
Carpenter	Good	Plumber	Good
Construction Electrician	Good	Precision Metal Fabricator	Good
Construction Millwright	Good	Pump Systems Installer	Good
Early Childhood Educator	Good	Refrigeration & A/C Mechanic	Good
Electrical Control Builder	Good	Roll Grinder/Former	Good
Electronic Service Technician	Strong	Sheet Metal worker	Good
Farm Equipment Technician	Good	Sprinkler System Installer	Good
General Machinist	Strong	Steamfitter	Good
Heavy Duty Equipment Tech.	Good	Tool and Gauge Inspector	Strong
Hairstylist	Good	Wooden Boat Rebuilder	Good
Hydraulic/Pneumatic Mechanic	Good		

Next, we listed the specific sectors and associated trades identified by the WWTAB scan as being growth industries in this region. Specifically, the environmental scan indicated a need for workers in the following sectors:

- Agribusiness
- Automotive
- Construction
- Information Communication
- Transportation

Within these sectors, we found several occupations that matched the *Ontario Job Futures 2000* list. Table 3 lists these trades. We considered trades occurring in both lists as being likely candidates for the development of assessment tools.

Table 3: Trades matching both Ontario Job Futures and the WWTAB Environmental Scan

Sector	Trade
Automotive	General Machinist
	Industrial Mechanic Millwright
	Mould Makers
	Pattern Makers
	Tool and Die Makers
Construction	Brick and Stone Masons
	Carpenters
	Electricians
	Sheetmetal Workers
Information Communication	Electronic Service Technicians
	Optics Technician

Researching the Educational Requirements for the Trades

As noted earlier, Apprenticeship Programs are governed by two distinct pieces of legislation in the province of Ontario: the *Trades Certification and Apprenticeship Act (TQAA)*, 1990, and the *Apprenticeship Certification Act (ACA)*, 1998.

The new *Apprenticeship Certification Act* includes an increase in educational standards. This is intended to match the needs of most employers, and help to improve the image of careers in skilled trades. Consequently, a minimum of Grade 12 education or its equivalent is now required for all candidates for an apprenticeships covered by this act. This constitutes a change for several popular apprenticeships, perhaps most notably careers in Hairstyling. We felt that it was important to include this trade as a potential focus for a set of assessment tools.

The construction trades, however, are not governed by the new rules. The industry committee responsible for construction trades set different educational standards in regulations, and continue to be governed under the *Trades Certification and Apprenticeship Act*. However, as we mentioned earlier, the academic requirements for training in these fields continues to be high, and grade 12 or equivalent is often a prerequisite for these trades as well. We saw this as a source of confusion for apprenticeship candidates, and decided to include a construction trade as a potential focus for assessments tools.

Researching the Needs of LBS Learners

Next, we considered the interests of LBS learners. We compiled a list of the apprenticeships that are commonly sited as long-term goals by learners who are just entering LBS programs. Again, we looked for similarities between the Ontario Job Futures and WWTAB list, and marked those as likely trades. Table 4 shows the original list of trades, with matches to Ontario Job Futures and WWTAB indicated.

Table 4: Learner Identified Trades

Trade	Ontario Job Futures	WWTAB Scan
Appliance Service Technician (small appliance repair)		
Autobody Repairer (Branch 1 & 2)	✓	
Automotive Painter	✓	
Automotive Service Technician		
Baker	✓	
Carpenter (construction and cabinet making)	✓	✓
Child and Youth Worker (or other social work careers)		
Cook		
Drywall, Acoustic and Lathing Applicator		
Early Childhood Educator	✓	
Electrician	✓	✓
Electronic Service Technician	✓	
General Machinist (or CNC Machining)	✓	✓
Hairstylist	✓	
Heavy-duty Equipment Technician	✓	
Horticulturist (Landscaping)		
Industrial Mechanic Millwright	✓	✓
Locksmith		
Mobile Crane Operator (Heavy Equipment Operator)		
Painter and Decorator		
Refrigeration and Air Conditioning Mechanic	✓	
Retail Meat Cutter		
Rofer		
Small Engine Technician (Small engine repair)		
Tool and Die Maker	✓	
Tower Crane (Heavy Equipment) Operator		
Welder (general and all position)		

Several of the trades appeared to be popular with LBS learners, and also appeared on either the *Ontario Job Futures 2000* list or the *WWTAB Environmental Scan*, or both. The next step was to consult with the project's key stakeholders to determine which two trades would finally be selected.

Selection of Apprenticeship Programs

We developed checklists for distribution to a number of key project stakeholders. They included:

- representatives from the literacy community (and through them, LBS learners);
- HRDC in Waterloo Region and Wellington County;
- Waterloo-Wellington Training and Adjustment Board; and,
- other employment-related agencies, such as Lutherwood/CODA.

Stakeholders were asked to note the three apprenticeship trades that they felt would most benefit from having LBS assessment tools developed for them. The results of this poll were tabulated, and the three most popular trades were identified. Next, we reduced the number to two by considering the objectives of the project. We wanted to create two sets of assessment tools that would represent very diverse kinds of trades. We also wanted to produce assessment tools that might be applicable to more than just one trade, if this was possible.

In the end, two trades have been selected: Construction Electrician and Hairstylist. These two diverse trades will have applicability to other trades, especially in the assessment tools for the lower LBS levels. For example, all construction tradespeople will need to learn about linear measurement at LBS levels one, two and three. Handling cash is a skill that Hairstylists and other retail salespeople will need to develop as well. Therefore, these assessment tools will be of value not only to apprenticeship candidates, but also to LBS learners with other, related long-term goals.

We could now turn our attention to the development of demonstration activities. This proved to be more contentious than we had anticipated. We first had to determine the needs of our target audience: the LBS learner.

Target Audience

Primarily, the demonstrations we were to develop were intended for learners in the LBS Program who are considering an apprenticeship in either the electrical or hairstyling trade. While on the surface this would seem to be a homogeneous group, the goal paths, abilities and competencies of learners in these categories can be quite different.

Goal Paths for Apprenticeship Candidates

Individuals wishing to apprentice as construction electricians begin by locating an employer that is willing to hire and train him/her. The candidate or employer then arranges a meeting with a Training Consultant from the Ministry of Training, Colleges and Universities apprenticeship office. The meeting's purpose is to determine the employer's eligibility to train apprentices. After this has been determined, the employer and apprentice enter into a training agreement, the trainee is registered as an apprentice, and training begins.

90% of apprenticeship training takes place on the job. The rest of the time, the apprentice takes part in classroom training. Under this general guideline, there are several possible paths. The apprentice may initially take part in on-the-job training on a full-time basis, while taking classes in the evenings and/or on weekends. Some training programs may be offered on a full-time basis periodically throughout the academic year. In this case, the employer grants the apprentice time off to attend classes.

In the case of hairstylists, however, the normal procedure would be to enrol in full-time in-class studies at a recognised school of hair design. The apprentice is

expected to begin the required number of hours of on-the-job training either during the time they are in school, or after the academic training has been completed.

Once an apprentice has completed his/her on-the-job and classroom training, and has demonstrated that s/he can meet the standards established for the trade by the relevant industry, s/he writes an exam for certification. Successful candidates are issued a Certificate of Apprenticeship and a Certificate of Qualification by MTCU.

Entry Requirements

The Hairstylist Apprenticeship Program is covered by the Apprenticeship Certification Act, 1998. Apprenticeships covered under this legislation require candidates to have attained a secondary school (grade 12) diploma or equivalent before beginning their apprenticeship training.

Construction electrician apprentices, on the other hand, are still governed by the Trades Qualification and Apprenticeship Act, 1990. Entry requirements for trades covered by this legislation vary. Construction and Maintenance Electricians require only a grade 10 education to qualify for the apprenticeship training.

However, the International Brotherhood of Electrical Workers, the organisation that oversees apprentice electricians, require candidates to have completed a secondary school education or equivalent before entering their training program. In addition, apprentices in this trade will be expected to meet the rigorous demands of post-secondary academic training, and rapid advancements in technology. As a result, they will need to have the academic skills and the ability to learn that are associated with a secondary school diploma.

Goal Paths for Apprenticeship Candidates in LBS Programs

Because of the differences between the two selected trades in terms of goal paths and entry requirements, LBS learners who plan to enter one of the programs can be expected to take a variety of paths to arrive at the same end. Which path they take will depend on their current abilities, competencies, credentials and experiences.

Table 5 was very helpful in considering the different paths that learners might take.

Table 5: Potential Users of Apprenticeship Demonstrations

LOW LBS LEVEL 1-3	INTERMEDIATE LBS LEVEL 3-4		HIGH LBS LEVEL 4-5
NOT READY FOR TRAINING	ALMOST READY FOR TRAINING		READY FOR ON-THE-JOB TRAINING
HAS GRADE 12 OR NEEDS GRADE 12 NEEDS LBS	NEEDS GRADE 12 NEEDS LBS	HAS GRADE 12 NEEDS LBS	HAS GRADE 12 OR NEEDS GRADE 12 NEEDS LBS
<u>LBS Short-term Goal:</u> Acquire Skills for on-the-job training	<u>LBS Short-term Goal:</u> Acquire grade 12/equivalent or GED	<u>LBS Short-term Goal:</u> Begin on-the-job training and/or Begin in-class training	<u>LBS Short-term Goal:</u> Acquire Grade 12/equivalent or GED and/or Begin in-class training

Typically, learners at the *lowest*¹ LBS levels (beginning of level 1 to approximately the middle of level 3) lack the literacy and basic skills they need to be successful in on-the-job apprenticeship training. Hairstylist apprentices at this level, in particular, will lack the reading and writing skills they need to be successful in a school of hair design, which is their first step in apprenticeship training.

For both trades, LBS learners at this level will need to develop the skills that they will need to complete simple literacy/numeracy related tasks that are normally expected in on-the-job training, as well as preparing for academic training at the secondary school level.

At the *intermediate* level (approximately from the middle level 3 to the middle of level 4) learners are more likely to be capable of completing work-related tasks involving literacy and numeracy skills, but may not be capable of completing more complex tasks or of participating in post-secondary in-class training. This group of learners can be further divided into two categories: those that already have a secondary school diploma, and those who do not.

¹ The terms *low intermediate* and *high* are **arbitrary divisions** used solely to categorise the abilities of learners at the various LBS levels.

For those without a secondary school diploma, the next step in long-term goal achievement would be to acquire a secondary school diploma or equivalent. For those who already have this credential, the next step would be to develop the academic skills required for both on-the-job and in-class training.

Learners at the *highest* LBS levels (from approximately the middle of level 4 to the end of level 5) may already be participating in on-the-job training, but may still lack the skills they need to take in-class training. Their next step would be to develop these skills.

Since learners could conceivably be following any number of goal paths, the demonstration activities created for them should reflect their diverse needs. We, therefore, decided that we would adjust the focus of the demonstration activities accordingly. In LBS levels 1, 2 and 3, we decided to focus on work-related skills that might also be applicable to everyday life, outside of the apprenticeship program. In levels 4 and 5, the focus would be on the literacy and basic skills used in each trade during academic training.

Selection of Demonstration Activities

For both sets of demonstration activities, we consulted with trades people from the respective trades: hairstyling and electricians. We asked these individuals to identify the kinds of tasks that apprentice candidates might expect to perform during both the on-the-job and classroom portions of training.

Next, we narrowed down the number of tasks we would use by focusing on those tasks that met the following criteria:

- demonstration activities should be authentic, real-life activities that apprentices in both fields would be expected to perform;
- demonstration activities should directly involve the integration and application of communications, numeracy and self-management/self-direction skills;
- demonstration activities should be appropriate for each of the 5 LBS levels in each discipline; and,
- to the extent that it is possible, demonstration activities should provide LBS learners with opportunities to acquire trade-related knowledge and skills.

Table 6 lists the demonstration activities that were developed for this project.

Table 6: List of Demonstration Activities

Electrician	Hairstylist
Level 1: Building a Simple Switch	Level 1: Making an Appointment
Level 2: Rewiring a Room	Level 2: Completing a Gift Certificate
Level 3: Calculating Your Hydro Bill	Level 3: Selecting a Hairstyle for Face Shapes
Level 4: Choosing a Career in the Electrical Trade	Level 4: Choosing a Career in Hairstyling
Level 5: Taking Entry Level Tests	Level 5: Research a Topic in Hairstyling

In some cases, the tasks that the trades people recommended were not directly linked to the use of literacy and basic skills, but were still deemed to be authentic and real-life. In these cases, we designed demonstration activities that required the use of these skills. Although this made the demonstration somewhat artificial, we felt that the tasks were important to include, since they are central to the day-to-day activities of apprentices working in the field.

For example, one hairstylist informed us that consulting with and advising clients about their needs was the most important aspect of the job. Advising clients about the kind of hairstyles that would best suit their face shape, age, personalities and lifestyles, for instance, is central to effective customer service. Experienced professional hairstylists normally do this “by sight”, with no literacy and basic skills being applied to the task. However, hairstyling apprentices learn about face shape and the kind of styles associated with each by reading about it while completing the in-class portion of training. We decided that asking an LBS learner to read about face shapes and to apply the information to making a judgement about face shape and hairstyles was an appropriate way to integrate literacy and basic skills into the demonstration.

Once we had a list of potential demonstration activities, it was necessary to gather authentic materials, and to examine each of the demonstrations in terms of their degree of skill integration and complexity. In this step, we were trying to determine what approximate LBS level a learner attempting these activities would require.

Gathering authentic materials proved to be more difficult than we had anticipated in some cases. We did not have access to learning materials that would be used during in-class training. In addition, many of the demonstrations we had selected did not have actual forms or other reading or writing materials that are used. In most cases, therefore, we looked for other materials such as magazine articles and Internet resources that could be adapted for the same purpose.

This was actually a benefit to the project, however. The lack of authentic materials made it possible to rewrite existing materials to more closely reflect the LBS level they were intended for. This step would likely have been necessary anyway, given that learning materials encountered in academic settings at the post-secondary level are frequently more complex than a learner at level 4 or 5 would be expected to manage.

Once we had gathered or created the materials, the next step was to examine them to determine the embedded literacy and basic skills. For each demonstration activity we asked the following set of questions:

- How would an apprentice use these materials?
- What is the LBS learner expected to *do* with these materials? What is the outcome of the demonstration?
- What is the overall LBS level of the demonstration?
- Which LBS learning outcomes are embedded in the task?
- What specific success markers are embedded in the task for each of the related learning outcomes? What are the *main* success markers?
- How will the assessor *know* that a learner is using the specific skills to complete the demonstration? What will the assessor *see* the learner doing?
- How will success with the demonstration be measured?

This step may seem somewhat out of place in light of suggestions from other sources, such as the Ontario Literacy Coalition's *Designing Down, Assessing Up (2001)*. These resources recommend that practitioners first identify the *gap* that exists between a specific learner's current skills and the skills that s/he will need to achieve the short-term goal.

In the case of this project, however, the objective was to create more *generic* demonstrations: demonstrations that would reflect the needs of *any* apprenticeship candidate who is functioning at a given LBS level. This difference meant that we would have to include an extra step in designing the demonstration activities: identifying the *prior learning* that would need to take place in order for a learner to successfully complete the task. This will be discussed further in the *Designing the Demonstrations* section of this report.

Once we understood the requirements of each demonstration, it was time to start designing the demonstrations themselves.

Designing the Demonstrations

For each of the ten demonstrations (one for each of the five LBS levels in two apprenticeships), we followed *best practice* for development. We chose to model the demonstrations after the sample demonstrations posted on the *Demonstrations Ontario* web site, and to use the resources provided in the *Quality Toolkit* section of the site. These resources are:

- Quality Principles for Developing Demonstrations;
- Essential Elements of a Demonstration; and,
- Quality Checklist: Checklist for Developing a Quality Demonstration.

We felt that by using these tools, we would create demonstrations that are consistent with *best practices* in assessment, and that were valid evidence of learner progress in improving literacy and basic skills. We also felt that using a familiar and consistent format

would benefit practitioners throughout Ontario who were familiar with the model demonstrations located at the Demonstrations Ontario web site. When designing the demonstrations, we used the following steps.

Gather the demonstration materials.

Materials were gathered. For each demonstration, we examined the materials to determine the:

- relationship to their respective apprenticeship program;
- *real-life application* in the apprenticeship program;
- level of integration and application of embedded literacy and basic skills;
- specific skills embedded in the task;
- the degree of problem-solving and critical thinking that would be required to complete the activity;
- overall LBS level of the task.

In cases where authentic materials existed, they were modified to match the LBS level that the demonstration was intended to assess. In other cases, authentic materials were designed *from scratch*, using valid and accurate information from a variety of sources.

At this stage, we also designed the task that the learner would be expected to perform as a demonstration. This involved examining how the materials would be used in a *real-life* situation, and modelling the demonstration on that basis. In some cases, we needed to modify the requirements, however.

In the LBS Program, demonstration activities are intended to assess the learner's progress in the development of *literacy and basic skills*. Although every effort has been made throughout the project to use real-life applications of these skills, many of the tasks that apprentices are expected to perform do not involve the integrated application of a number of LBS learning outcomes.

For example, an electrician's apprentice may be required, as part of his day-to-day activities, to measure lengths of wire, but s/he will not necessarily be expected to write that information down, since it may be up to the electrician to record the amount of wire used on an invoice. In order to integrate the outcomes *Use Measurements for Various Purposes* and *Perform Basic Operations with Numbers*, it was necessary to create a chart upon which the LBS learner would record and total the measurements taken

We recognise that using a chart like this one is somewhat artificial when it comes to *real-life* application of skills. However, we were also mindful of the fact that LBS learners who are considering an apprenticeship program will be expected to complete similar tasks when they are working in an academic setting (either in completing a secondary school education or equivalent, or in the in-class portion of apprenticeship training). This is another reason to modify authentic tasks to include an integrated set of learning outcomes.

In every case, we attempted to balance the need to create *authentic* demonstrations with the need to create demonstration activities that accurately reflect the integrated use of literacy and basic skills.

We also tried to keep in mind that LBS instructors are *not* qualified to teach the trade-specific skills that hairstylist or electrician's apprentices would need. We therefore had to include trade-specific information within the demonstration itself, using concepts and vocabulary that are consistent with the learner's current level of functioning.

Give the demonstration a title

The title for each demonstration needed to be meaningful, and actually reflect what the learner would *do* during the demonstration.

Describe the demonstration activity

This step is designed to provide learners and practitioners with an overview of the demonstration. It tells them precisely what the learner will be doing, and gives them an idea about how the demonstration is linked to the short-term goal and to the LBS Learning Outcomes.

State the main goal path

This step is intended to link the demonstration to a long-term goal as described in LBS Programs. It also provides practitioners with a way to record the demonstration on the training plan for statistical purposes and record keeping. There are three possible main goal paths for each demonstration.

- *employment;*
- *further education or training; or*
- *personal independence.*

State the short-term goal(s)

For each demonstration, there are several possible short-term goals. These are listed so that practitioners and learners can decide whether the demonstration activity meets their current needs. Learners may be working on one or more of the listed short-term goals.

Assign an overall LBS level

For this step, we examined both the demonstration materials and the complexity of the tasks that the learner was expected to perform. We also considered the level of integration that the learner would need to use to successfully complete the task. Using MTCU's *Working With Learning Outcomes*, we assigned an overall LBS level.

State the Domains and Learning Outcomes

Each demonstration lists the specific domains that are embedded in it, as well as the relevant learning outcomes for each domain. This allows practitioners and learners to quickly decide whether the demonstration activity is appropriate. It also provides evidence of the demonstration's validity in that it shows exactly what will be assessed.

State the Skill Sets and Success Markers

A list of skill sets and success markers was created for each demonstration activity. This list reflects the *main* skills that are embedded in the demonstration, which can be *demonstrated by the learner*. These are the skills that the practitioner will be able to observe and evaluate while the learner is completing the demonstration, as well as in the final results. This adds to the validity of the demonstration.

Provide instructions for the practitioner

Instructions for the practitioner ensure that the demonstration will be administered in a consistent way, and will improve the reliability of the demonstration. In addition, instructions to the practitioner offer suggestions on how to administer the demonstration, as well as

- possible variations for administering the demonstration;
- assistance that the practitioners is allowed to give the learner, consistent with the LBS level;
- a list of resources that the learner will need to complete the demonstration; and,
- an answer sheet for the demonstration (see the *Design an Assessment Tool* section for further details).

Time limits were not included with these demonstrations, since they have not been field tested with learners at this time.

Provide instructions for the learner

Each demonstration also includes instructions for the learner. The learner instructions are written clearly, and at the appropriate LBS Level. They inform the learner about how to complete the demonstration, as well as the resources that they are allowed and will need to complete the demonstration.

Design an assessment tool

An assessment tool was designed for each demonstration that is consistent with the demonstration itself. When selecting the assessment tool, we kept the following questions in mind.

- What learning outcomes, skill sets and success markers is the demonstration assessing?
- Does the demonstration activity measure what we want it to measure?
- What is the level of proficiency required for success with the demonstration?
- What kind of assessment tool (cut line, marking scheme or rubric) is best for use with this demonstration?
- How would the performance of this task be judged in real-life situations?
- What kind of feedback would be most useful to the learner completing the demonstration activity?
- What opportunities will the learner have for self-reflection and self-evaluation?

Demonstration Format

All of the demonstrations for both trades are formatted in the same way. Each demonstration contains the following components.

Cover Page

The cover page contains the information that a practitioner will need to select an appropriate demonstration for the learner, as well as places to record the learner's identifying information and the general outcome of the demonstration.

Embedded Skills

Each demonstration includes a list of the learning outcomes, skill sets and success markers that are embedded in the task. This list is intended to provide details of the task for assessment purposes.

Demonstration Guidelines

Each demonstration also contains demonstration guidelines that are instructions for the practitioner. As noted earlier, the guidelines include instructions for administering the demonstration, assistance allowed resources required and an answer sheet with the assessment tool.

Demonstration Activity

The demonstration is presented for the learner and includes a cover sheet, instructions, all of the materials required to complete the demonstration, and a learner self-evaluation method.

Evaluation of Demonstrations

Once completed, the demonstrations were shared with two groups of individuals: practitioners and trades people.

The trades people who were consulted in the early stages of demonstration development were again called upon to review the completed materials. They were asked to evaluate the demonstrations on the basis of:

- the accuracy of the information contained in the demonstrations;
- the applicability of the demonstrations to on-the-job or in-class apprenticeship training;
- the relevance of the demonstrations to the day-to-day responsibilities of an apprentice;
- the relevance of the demonstrations to other day-to-day activities that a learner might need to do; and,
- the overall clarity and logical presentation of the demonstration.

Practitioners who reviewed the demonstrations were asked to comment on;

- the appropriateness of the demonstration for the assigned LBS level;
- the validity of the list of embedded learning outcomes, skill sets and success markers;
- the fairness of the conditions for administering the demonstration;
- the appropriateness of the assessment tool;
- the clarity and logic of the demonstration and the instructions; and
- feedback from learners, if the demonstration was administered.

In no cases did the practitioners attempt to use the demonstrations with learners. It was not possible, therefore, to determine the time limit that should be placed on the individual demonstrations, nor the accuracy of the assigned overall LBS level.

The demonstrations were revised on the basis of feedback from the two groups of individuals. Feedback from experienced trades people was generally good. There were some suggestions to modify existing information to more closely reflect the reality of day-to-day practice in the trade. In some cases, suggestions were made to change vocabulary to reflect current usage.

LBS instructors were most often concerned with the length of time that demonstrations would take to complete. We therefore included suggestions for administering the demonstrations in more than one session, according to the learner's special needs.

Practitioners working with low-level learners also noted that the demonstrations at Levels 4 and 5 were likely to difficult for their students to complete. We feel that the demonstrations now clearly indicate the level and type of prior learning that would be required to successfully complete the demonstration. We also feel that assessment tools provided for demonstrations at levels 4 and 5 demonstrations could be modified to accommodate learners at lower levels.

Electrician Apprenticeship Candidates

Demonstration: LBS Level 1 Building a Simple Switch

Name: _____

School: _____

Date Completed: _____

Learner Name: _____ Date Completed: _____

Demonstration Title: **Building a Simple Switch**

LBS Level: **1**

Description: In this demonstration, the learner will read a set of instructions and build a simple switch to operate a battery-powered device.
Main Goal Path: Further education and training
Short-term Goal: The goal is to increase reading and numeracy skills to follow instructions at level 1 to prepare for entry to an apprenticeship program as a construction electrician.
Primary Outcome: Read with understanding for various purposes
Secondary Outcomes: Write clearly to express ideas Perform basic operations with numbers Use measurement for various purposes
Materials Required: <ul style="list-style-type: none">• Scissors, magic marker, Crazy glue, wire strippers• 2 lids from a tin can• a natural or synthetic sponge, approximately 3" x 5"• 9 volt battery (this should be a relatively fresh battery, since the buzzer draws quite a bit of power)• 12 inches of doorbell or telephone wire• 12 volt DC electric buzzer (Radio Shack catalogue #273-55, \$4.29, plus tax)• electrical tape
Practitioner Name:
How is this demonstration linked to the learner's goals?
Demonstration Results:
Activity Successfully Completed? <input type="checkbox"/> Yes <input type="checkbox"/> No
Level Successfully Completed? <input type="checkbox"/> Yes <input type="checkbox"/> No

Practitioners Instructions:

1. Make sure the learner understands the information and instructions for this demonstration
2. Go over the evaluation section with your learner to ensure that the learner understands what skills, knowledge or behaviours are being assessed by this demonstration and how they will be evaluated.
3. Discuss with the learner and decide on a reasonable length of time for the completion of this demonstration activity. Record this information on the assessment form.
4. When the learner has completed the demonstration, provide a way for the learner to self-reflect on the experience. Complete the assessment form with the learner, and note whether it was successful or needs to be tried again.

Prior Learning Required:

The learner needs to be familiar reading short texts, simple written and illustrated instructions, reading linear measurements in inches, definition of familiar electrical terms.

Help Allowed:

- clarification of instructions
- assistance with decoding unfamiliar words.

Possible Adaptation:

This demonstration may be completed in three separate sessions, if time or concentration are issues. This demonstration could also be modified for a group project. In that case, the speak and listen effectively learning outcome could be used.

Demonstration Title: Building a Simple Switch**LBS Level: 1**

Skills Embedded in the Task		
Learning Outcomes	Skill Sets	Success Markers
Read with understanding for various purposes	Read and Comprehend	<ul style="list-style-type: none"> Follows written instructions up to 6 steps, and instructions contain only one step per sentence (transition from level 1 to level 2) reads a short text made up of a minimum of 2-3 short, simple sentences, may include illustrations and most words can be understood in context (transition from level 1 to 2)
	Read to find information and for research	<ul style="list-style-type: none"> identifies various conventions of formal texts and uses them to locate and interpret information (diagrams)
Write clearly to express ideas	Write for various purposes	<ul style="list-style-type: none"> expresses an idea in writing (transition from level 1 to 2)
		<ul style="list-style-type: none"> completes forms that require only personal identifying information (transition from level 1 to 2)
Perform basic operations with numbers	Write numbers	<ul style="list-style-type: none"> read and write numerals from 0 to 100
Use measurement for various purposes	Linear measurement	<ul style="list-style-type: none"> estimates, measures and records the linear dimensions of objects using inches (level 2)

Assessment Tool; Marking Scheme		
Learning Outcome	Criteria	# of Marks
Read with understanding for various purposes	Reads and follows instructions for Part 1 accurately.	/5
	Reads and follows instructions for Part 2 accurately.	/5
	Reads and follows instructions for Part 3.	/5
	Answers the questions correctly in Part 3.	2 mark for each correct answer
Write clearly to express ideas	Answers questions in writing. The meaning of the answer is clear, but the answer does not have to be a complete sentence.	3 marks for each answer
	Completes the cover sheet correctly.	/5
	Prints answer legibly.	/5
Total Marks		/40

The level of performance required for success in this demonstration is

The agreed upon amount of time for the learner to complete this task is

Demonstration Title: Building a Simple Switch LBS Level: 1
Learner Instructions

What to do

1. Read the whole experiment first.
2. Do one part at a time.
3. Do all the steps in each part.
4. Ask your teacher to check your work in each part.

Part 1: Getting Started

In this part you will get your supplies ready. Make sure you have everything on both lists.

Tools

- A pair of scissors
- A pair of wire strippers
- A magic marker
- Crazy Glue

Supplies

- 12 volt electric buzzer from Radio Shack
- About 12 inches of doorbell or telephone wire
- 9 volt battery
- 2 lids from a tin can
- A sponge
- Electrical tape

And that's it! You're ready to start your experiment!

Part 2: Build the switch

Now it's time to put the switch together. Remember to be careful when working with the tin can lids. They're sharp!

1. The two tin can lids will be the two sides of the switch.
2. Use a magic marker to trace the shape of one tin can onto the sponge.
3. Draw a line to divide the circle you have drawn in half.
4. Cut a half circle out of the sponge.
5. Glue the sponge to both tin can lids so that it looks like the picture.



Your work should look like this

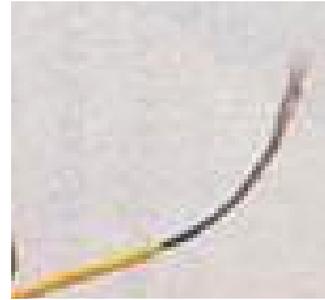
You're ready to get wired!

Part 3: Getting Wired

Now it's time to wire the switch to the buzzer and battery.

First get the wire ready.

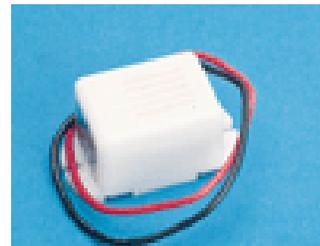
1. Separate the wire into two strands.
2. Use only one strand of this wire.
3. Strip about 2 inches off both ends of the strand of wire.



One strand of stripped wire

Next wire the buzzer to the switch and battery.

1. Use electrical tape to tape the red wire from the buzzer to the top half of your switch.
2. Use electrical tape to tape the black wire from the buzzer to the negative (-) pole of the battery.



Buzzer with red and black wire



9 Volt Battery

3. Use the electrical tape to tape the stripped wire to the bottom of your switch.
4. Use the electrical tape to tape the wire from the bottom of your switch to the positive (+) pole of the battery.



Your switch should now look like this.

Now you're playing with power!

Part 3: Buzzing Around

It's time to test your switch.

1. Make sure that all of the wires are attached with tape.
2. Ask your teacher to check your work.
3. Press the two tin cans together.
4. Answer the questions below.
5. Put your name, school and the date on the front page of this handout.

What happened when you pressed the lids together?

Are there things in your house that work the same way as the switch? What are they?

Did you like doing this experiment? Why or why not?

Electrician Apprenticeship Candidates

Demonstration: LBS Level 2 Rewiring a Room

Name: _____

School: _____

Date Completed: _____

Learner Name: _____ Date Completed: _____

Demonstration Title: **Rewiring a Room**

LBS Level: **2**

Description: In this demonstration, the learner will determine the gauge of wire to use by reading a chart, and then read a diagram to determine the amount of wire required for the room.
Main Goal Path: Further education and training.
Short-term Goal: The goal is to increase reading and numeracy skills to read diagrams, locate information in tables, read measurements, and follow instructions at level 2 to prepare for entry to an apprenticeship program as a construction electrician.
Primary Outcome: Read with understanding for various purposes.
Secondary Outcomes: Perform basic operations with numbers. Use measurement for various purposes. Write clearly to express ideas.
Materials Required: <ul style="list-style-type: none">• Pen or pencil, eraser, etc.• Dictionary or glossary of electrical terms.
Practitioner Name:
How is this demonstration linked to the learner's goals?
Demonstration Results: Activity Successfully Completed? <input type="checkbox"/> Yes <input type="checkbox"/> No Level Successfully Completed? <input type="checkbox"/> Yes <input type="checkbox"/> No

Practitioners Instructions:

1. Make sure the learner understands the information and instructions for this demonstration
2. Go over the evaluation section with your learner to ensure that the learner understands what skills, knowledge or behaviours are being assessed by this demonstration, as well as how they will be evaluated.
3. Discuss with the learner and decide a reasonable length of time for the completion of this demonstration activity. Record this information on the assessment form.
4. When the learner has completed the demonstration, provide a way for the learner to self-reflect on the experience. Complete the assessment form with the learner, and note whether it was successful or needs to be tried again.

Prior Learning Required:

The learner needs to be familiar reading short texts, simple written instructions, simple tables, linear measurements, and definition of familiar electrical terms and imperial units of linear measure.

Help Allowed:

- Clarification of instructions.
- Assistance with decoding unfamiliar words.

Possible Adaptation:

This demonstration may be completed in two separate sessions, if time or concentration are issues.

Demonstration Title: Rewiring a Room**LBS Level: 2**

Skills Embedded in the Task		
Learning Outcomes	Skill Sets	Success Markers
Read with understanding for various purposes	Read and Comprehend	<ul style="list-style-type: none"> reads a short text made up of a minimum of 2-3 paragraphs and may include illustrations, and many words can be understood in context follows written instructions up to 6 steps, and instructions contain only one step per sentence (transition from level 1 to 2)
	Read to find information and for research	<ul style="list-style-type: none"> identifies various conventions of formal texts and uses them to locate and interpret information (simple charts and drawings)
Write clearly to express ideas	Write for various purposes	<ul style="list-style-type: none"> writes answers to simple comprehension questions in sentence form
Perform basic operations with numbers	Write numbers	<ul style="list-style-type: none"> reads and writes numerals from 0 to 1,000
	Add and subtract	<ul style="list-style-type: none"> adds and subtracts two-digit numbers with and without regrouping with sums less than 101 (transition from level 1 to 2)
Use measurement for various purposes	Linear measurement	<ul style="list-style-type: none"> estimates, measures and records linear dimensions of objects (using metric or imperial measures) rounds off measurements to the nearest foot

Demonstration Title: Rewiring a Room
Answer Sheet

LBS Level: 2

Part 1: What kind of wire is needed (Total of 8 marks)

Question
<p>1. Why do you think the electrician wants all new wire?</p> <p>He room is already wired with aluminium. You can't install copper-wired fixtures and receptacles when there is aluminium wire installed.</p>
<p>2. What gauge of wire should John use to rewire the recreation room circuit?</p> <p>14 gauge wire</p>

Part 2: How much wire will you need? (Total of 22 marks)

Measure from...	You can use this column to do your rough work	Total
The breaker box to the junction box for the light.	$4' + 6' + 8' =$	18'
Junction box for the light to receptacle #1	$6' + 7' =$	13'
Receptacle #1 to receptacle #2	$8' =$	8'
Junction box for the light to light switch	$6' + 6' 8'' + 4' =$	16' 8''
Subtotal of wiring for the room	$18' + 13' + 8' + 16' 8'' =$	55' 8''
Add 5 feet for making all the connections	$55' 8'' + 5' =$	60' 8''
Round up to the nearest foot		61'
Total wiring needed for the room		61'

Demonstration Title: Rewiring a Room
Assessment Tool: Marking Scheme

LBS Level: 2

Criteria	# of Marks	Comments
<p>Part 1: What kind of wire is needed?</p> <p><u>Question 1: 5 marks</u></p> <ul style="list-style-type: none"> • Follows written instructions. /1 • Locates and interprets information in a short text. /1 • Writes the correct answer to a simple comprehension question in sentence form. /3 <p><u>Question 2: 3 marks</u></p> <ul style="list-style-type: none"> • Locates and interprets information in a short text. /1 • Writes the correct answer to a simple comprehension question in sentence form. /2 <p>Part 1 Total /8</p>		
<p>Part 2: How much wire will you need?</p> <p><u>Question 3: 7 marks</u></p> <ul style="list-style-type: none"> • Locates and interprets information in drawings. /5 • Reads and writes numerals from 0 to 1,000. /5 • Adds and subtracts two-digit numbers with and without regrouping. /5 • Records linear dimensions of objects using imperial measures. /5 • Round up to the nearest foot. /2 <p>Part 2 Total /22</p>		
Total Marks	/30	

The level of performance required for success in this demonstration is

The agreed upon amount of time for the learner to complete this task is

Demonstration Title: Rewiring a Room
Learner Instructions

LBS Level: 2

What to do

1. Read the whole activity first.
2. Do one part at a time.
3. Ask your teacher if you need something explained to you.

Part 1: What kind of wire is needed?

Read this story and the information in the box. Answer the questions using complete sentences.

Mike Smith owns a house that was built in 1968. He would like to turn a part of his unfinished basement in to a recreation room. The room is already wired with aluminium. Mike would like to add 2 new receptacles and a new light fixture in his room. He calls your company to do the work.

When you arrive, the electrician tells you to run new *copper* wire from the circuit box to the places in the room where the receptacles and light will be. Why do you think electrician wants all new wire?

What's wrong with aluminium wiring?

Nothing really, if it's properly maintained. There was a copper shortage between the 1950's and 1970's. So, aluminium wiring was used in most houses built or renovated at that time. Builders used a larger gauge aluminium wire so that it could safely carry the same amount of current as copper.

But, there are some problems with aluminium wire.

- it is softer than copper and can be damaged easily;
- it can come loose or get disconnected when receptacle it is wired to gets hot;
- it overheats and breaks faster than copper.

After the 1970's builders went back to using copper. Today, electrical appliances, lighting fixtures and other electrical devices are wired with copper. So, what's the problem? When you mix copper and aluminium it can start a fire!

If your house is wired with aluminium, you have to use switches receptacles and fixtures that are made for aluminium. If you can't find these, call an electrician.

~ Turn the page ~

You will have to install copper wire before you can install the receptacles and the light fixture. When all the wire is in place, the electrician will make the connections. Only a licensed electrician can make these connections.

First you will have to decide what gauge of wire you need to install. Here is a chart that describes some different wire gauges and their uses.

Copper Wire Gauges

Wire Gauge	Size (Max. amp)	Purpose
14	15	Lighting, small appliances, receptacles for lamps, televisions, etc.
12	20	Larger appliances and receptacles (microwave ovens, motors, etc.)
10	30	Major appliances (dryers and 220 volt appliances such as air conditioners or furnace).

What gauge of wire should John use to rewire the recreation room circuit?

Part 2: How much wire will you need?

Next, you will have to figure out how much wire you will need. On the next page there is a drawing of the room that needs rewiring. It has all the measurements that you will need to use.

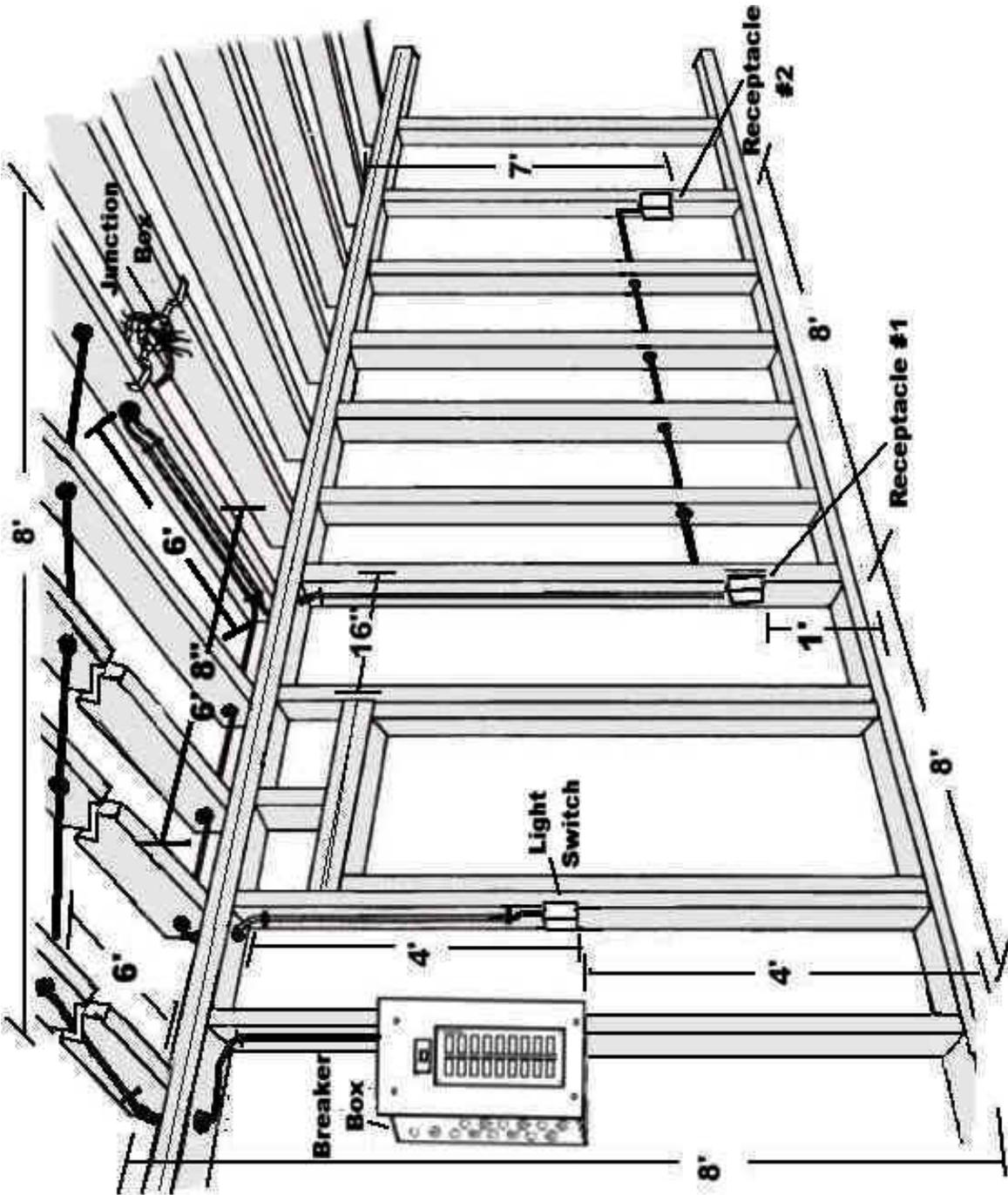
Now look at the chart below. For each step in the chart, you will have to add more than one measurement. Look at the diagram to see all the lengths that you will need for each step.

Fill out the chart below using the measurements from the diagram.

Column 1	Column 2	Column 3
Measure from...	You can use this column to do your rough work	Total
Step 1 The breaker box to the junction box for the light.		
Step 2 Junction box for the light to receptacle #1.		
Step 3 Receptacle #1 to receptacle #2.		
Step 4 Junction box for the light to light switch.		
Subtotal of wiring for the room.		
Add 5 feet for making all the connections.		
Round up to the nearest foot		
Total wiring needed for the room.		

Give this handout to your teacher when you are done.

Mike's Basement Room



it.

Electrician Apprenticeship Candidates

Demonstration: LBS Level 3 Calculating Your Hydro Bill

Name: _____

School: _____

Date Completed: _____

Learner Name: _____ Date Completed: _____

Demonstration Title: **Calculating Your Hydro Bill**

LBS Level: **3**

Description: Read a text about how hydro costs are calculated. Determine the amount and cost of electricity used in a real-life situation. Read a meter and calculate the cost of electricity provided.
Main Goal Path: Further education and training.
Short-term Goal: The goal is to increase reading and numeracy skills to read diagrams, locate information in tables, read measurements, and follow instructions at level 2 to prepare for entry to an apprenticeship program as a construction electrician.
Primary Outcome: Perform basic operations with numbers.
Secondary Outcomes: Read with understanding for various purposes. Use measurement for various purposes.
Materials Required: <ul style="list-style-type: none">• Pen or pencil, eraser, etc.• Dictionary or glossary of electrical terms.• Calculator.
Practitioner Name:
How is this demonstration linked to the learner's goals?
Demonstration Results:
Activity Successfully Completed? <input type="checkbox"/> Yes <input type="checkbox"/> No
Level Successfully Completed? <input type="checkbox"/> Yes <input type="checkbox"/> No

Practitioners Instructions:

1. Make sure the learner understands the information and instructions for this demonstration
2. Go over the evaluation section with your learner to ensure that the learner understands what skills, knowledge or behaviours are being assessed by this demonstration, as well as how they will be evaluated.
3. Discuss with the learner and decide a reasonable length of time for the completion of this demonstration activity. Record this information on the assessment form.
4. When the learner has completed the demonstration, provide a way for the learner to self-reflect on the experience. Complete the assessment form with the learner, and note whether it was successful or needs to be tried again.

Prior Learning Required:

The learner needs to be able to independently read textbooks, charts and diagrams. The learner should be able to select and perform basic operations with whole numbers, decimals and money amounts, divide a whole number by 1,000, multiply a decimal number by a decimal number to hundredths.

Help Allowed:

- The learner can use a calculator for multiplying decimal numbers to hundredths.
- The learner may use a dictionary, thesaurus or glossary of electrical terms.

Possible Adaptation:

The learner could expand on the demonstration by reading his/her own hydro meter at home, or by checking the calculation on his/her own bill.

This demonstration may be completed in three separate sessions, if time or concentration are an issue.

Demonstration Title: Calculating Your Hydro Bill**LBS Level: 3**

Skills Embedded in the Task		
Learning Outcomes	Skill Sets	Success Markers
Read with understanding for various purposes	Read to find information and for research	<ul style="list-style-type: none">• uses conventions of formal text to locate and interpret information (simple charts)• uses a dictionary or other reference resources as needed
	Perform basic operations with numbers	<ul style="list-style-type: none">• adds three-digit numbers with and without regrouping (level 2)• subtracts two five-digit numbers (level 3+)• adds and subtracts decimal numbers to hundredths
	Multiply and divide	<ul style="list-style-type: none">• multiplies a two-digit number by a three-digit number• multiplies a four-digit number by a two-digit number (level 4?)• divides whole numbers by 1,000 (not one of the success markers)• multiplies decimal numbers to hundredths by a decimal number to hundredths using a calculator

**Demonstration Title: Calculating Your Hydro Bill
Answer Sheet**

LBS Level: 3

Part 1: Understanding Electricity

Question
1. How many volts would you have if you had 5 amps of energy with 10 ohms of resistance? (15 volts)
2. How many watts would be transferred if you had 50 volts at 5 amps? (250 watts)

Part 2: Calculating Electricity Use

Question 3
a. Calculate the total number of watts used for each device. (100, 200, 120, 80 watts)
b. Find the total watts used. (500 watts)
c. Calculate how many kilowatts that would be. (0.50 kilowatts)
d. Calculate the number of kilowatt hours. (2.5 kilowatt hours)
e. Calculate the cost of electricity for a 5 hour period at 7¢ per kilowatt hour. (\$0.175)
f. Calculate the cost to run the same electrical devices, for the same number of hours per day, in the month of September? Remember that September has 30 days. (\$5.25)

Part 3: Reading Your Meter

Question
4. Read the meter in the example above and record the meter reading. (6,254 Kwh's)
5. Read the meter in the example above and record the meter reading. (5,247 Kwh's)
6. a) Total number of kilowatt hours used in 2 months. (1,321 Kwh's) b) Cost of electricity at 7 cents per kilowatt-hour, rounded off to the nearest cent. (\$9.247 rounded off to \$9.25)

Demonstration Title: Calculating Your Hydro Bill
Assessment Tool: Marking Scheme

LBS Level: 3

Criteria	# of Marks	Comments
<p>Part 1: Understanding Electricity</p> <p><u>Question 1: 3 marks</u></p> <ul style="list-style-type: none"> • locate and apply formula from text /2 • answer a multiplication question /1 <p><u>Question 2: 3 marks</u></p> <ul style="list-style-type: none"> • locate and apply formula from text /2 • answer a multiplication question /1 <p>Part 1 Total /6</p>		
<p>Part 2: Calculating Electricity Use</p> <p><u>Question 3: 12 marks</u></p> <ul style="list-style-type: none"> • Calculates the watts used by 4 electrical devices by multiplying (3a) /2 • Calculates the total wattage used by adding (3b) /2 • Divide a 3-digit number by 1,000 (3c) /2 • Multiply a decimal number by a whole number (3d) /2 • Multiply a decimal number by a money value (3e) /2 • Multiply a decimal number by a whole number (3f) /2 <p>Part 2 Total /12</p>		

Criteria	# of Marks	Comments
Part 3: Reading Your Meter		
<u>Question 4: 5 marks</u>		
• Locate and interpret information on a diagram.	/3	
• Write the correct answer in standard form.	/1	
<u>Question 5: 5 marks</u>		
• Locate and interpret information on a diagram.	/3	
• Write the correct answer in standard form.	/1	
<u>Question 6:</u>		
• Select the correct operations.	/2	
• Calculate the correct solution.	/2	
Part 3 Total	/12	
Total Marks	/30	

The level of performance required for success in this demonstration is

The agreed upon amount of time for the learner to complete this task is

Instructions

1. Look over the whole activity first.
2. Read the material, and answer all of the questions.
3. Try to work on your own without your teacher's help.
4. Make sure you fill in the information on the cover page before you hand in the activity.
5. You can use a calculator to complete questions 2c), 2d), 2e) and 2f) *only*.
6. You can use a dictionary if you are unsure of any of the words in this activity.

Part 1: Understanding Electricity

When the hydro bill arrives in the mail, most people just check the total amount owing and pay it. They don't think about how the hydro company calculates the charges. But, knowing a little about how you are charged for electricity can help you find ways to save money and detect electrical problems in your house.

Whenever you turn on a light or electrical appliance, electrons begin moving through the wire, creating electricity. The *rate of flow of electrons* through a wire is measured in units called *amps*, which is short for amperes.

The symbol I is used to represent *amps* or *current*.

All electrical devices resist the flow of current. This *resistance* is similar to friction. The energy that is used to overcome resistance appears as heat. Electrical resistance is measured in units called *ohms*.

The symbol R is used to represent resistance or ohms.

It takes hard work to overcome electrical resistance. The *volt* is the *unit of electromotive force needed to move a current of one amp through a resistance of one ohm*.

The symbol V is used to represent volts.

To calculate voltage, you multiply the amps or current by the ohms.

$$V = I \times R$$

What's electricity?

The electricity that we pay for is electrical *power*, not the amount of electrical energy generated. *Electrical power* is the *rate at which electrical energy is transferred*. Electrical power is measured in units called *watts*. Watts (power) is calculated by multiplying volts and amps.

$$P = V s I$$

Answer the following two questions based on what you have just read.

1. How many volts (*V*) would there be if you had 15 amps (*I*) of energy and 10 ohms (*R*) of resistance?
2. How many watts (*P*) would be transferred if you had 50 volts (*V*) and 5 amps (*I*)?

Part 2: Calculating electricity use

It doesn't take much to use up one watt, so our electricity usage is measured in *kilowatts*.

$$1 \text{ kilowatt} = 1,000 \text{ watts}$$

But, we don't really pay for electrical power itself. Electrical rates are based on how long we use an amount of power that is transferred to us. In other words, we pay for the cost *per kilowatt-hour (Kwh)*. One kilowatt hour means that *1 kilowatt (1,000 watts) is transferred continuously for a period of 1 hour*.

Here's an example. Let's say that you turn on a lamp with a 100 watt bulb at 6:00 p.m. and turn it off at 11:00 p.m. It takes 100 watts to light the bulb.

$$100 \text{ watts} = 100 \div 1000 \text{ kilowatt} = 1 \div 10 \text{ kilowatts} = 0.1 \text{ kilowatts}$$

So, the light bulb will use 0.1 kilowatts. But, the light will be on for 5 hours (from 6:00 p.m. until 11:00 p.m.). So, the lamp will use 0.1 kilowatts for 5 hours.

$$0.1 \text{ kilowatts} \times 5 \text{ hours} = 0.5 \text{ kilowatt hours}$$

Electricity rates vary according to the season when electricity is used, where you live, and sometimes, by how much electricity you use. Let's say that hydro in your area is 7¢ per kilowatt-hour.

$$0.5 \text{ kWh} \times \$0.07 = \$0.035$$

So, using a lamp with a 100 watt bulb for 5 hours will cost you 3 _ cents. That doesn't seem like very much at all! But normally, we use much more than just one lamp during the evening hours. Here is an example of electricity use in the typical household.

Based on what you've just read, answer the following questions.

3. Between the hours of 6:00 p.m. and 11:00 p.m., John has agreed to clean the oven. Meanwhile Mary is watching television in the livingroom and has two lamps burning. Adam is reading in his bedroom. Let's see how many watts all of these devices use.
 - a) **Calculate the total number of watts used for each device. Write your answers in the "Total Watts" column.**

- b) Add up the watts to find the total watts used. Write your answer in the “Total Watts” column.

Electrical device	Number of Watts	Total Watts
1 kitchen light	100 watts	
2 livingroom lamps	100 watts <i>each</i>	
1 television	120 watts	
2 bedroom lamps	40 watts <i>each</i>	
Total number of watts		

- c) Now calculate how many kilowatts that would be.

_____ watts ÷ 1,000 = _____ kilowatts

- d) Next, calculate the number of kilowatt hours.

_____ kilowatts x 5 hours = _____ kilowatt hours

- e) Finally, calculate the cost of electricity for a 5 hour period at 7¢ per kilowatt-hour.

_____ kilowatt hours x \$0.07 = \$ _____

- f) How much would it cost if the same electrical devices were to run for 5 hours each day in the month of September? (Remember that September has 30 days!)

Notice that in Question 3 we did not include the cost of running the refrigerator or other major appliances. Electrical appliances can use large amounts of electrical power. For example, if John was cleaning a *self-cleaning* oven, it would draw about 2600 watts! That’s 2.6 kilowatts. At 7¢ a kilowatt-hour, that’s 18.2¢ for every hour that the oven is operating.

Also keep in mind that hydro providers also include distribution and customer charges in the monthly charges. Electricity is also subject to the Goods and Services Tax (GST). These charges will increase the final amount that you owe.

Part 3: Reading your meter

The electrical meter is usually installed by the hydro company on the outside wall of your house or in the basement. The meter records the number of kilowatt-hours you have used.

Newer meters are digital and quite easy to read. Older meters, however, use a four-dial display. Each dial on the meter represents a different place value.



- One complete revolution of dial #1 represents 10,000 Kwh (kilowatt hours)
- One complete revolution of dial #2 represents 1,000 kWh (kilowatt hours)
- One complete revolution of dial #3 represents 100 kWh (kilowatt hours)
- One complete revolution of dial #4 represents 10 kWh (kilowatt hours)

The electrical meter is usually installed by the hydro company on the outside wall of your house or in the basement. The meter records the number of kilowatt-hours you have used. The dials on the meter represent the place value.

Newer meters are digital and quite easy to read. Older meters, on the other hand, use a four-dial display. Each dial on the meter represents a different value of kilowatt hours.

- One complete rotation of dial #1 represents 10 Kwh (kilowatt hours)
- One complete rotation of dial #2 represents 100 kWh (kilowatt hours)
- One complete rotation of dial #3 represents 1,000 kWh (kilowatt hours)
- One complete rotation of dial #4 represents 10,000 kWh (kilowatt hours)

Instead of counting kilowatt hours, imagine that the meter is actually counting pennies. Dial #1 moves up one every time you put a penny on the pile.

When you get to 10 pennies, dial #1` returns to the 0, and dial #2 moves from 0 to 1. In other words, dial #2 counts 1 dime every time dial #1 makes a complete rotation.

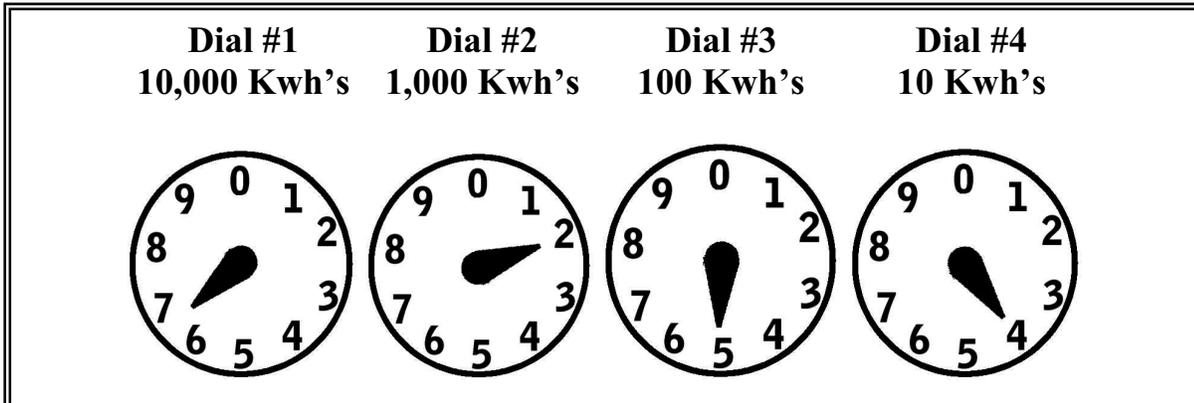
Tens	Ones
0	1
0	2
0	3
0	4
0	5
0	6
0	7
0	8
0	9
1	0

Now think about kilowatt hours again. When dial #1 makes one complete rotation, it means that the meter has counted up 10 kilowatt hours. Dial #1 will then return to 0, and dial #2 will go from 0 to 10 kilowatt hours. When dial #2 reaches the 0 again, that means there are 100 kilowatt hours on the meter. Dial #2 will go back to 0, and dial #3 will go from 0 to 1. And so on.

The meter is read from right to left. When the arrow on the dial is resting between two numbers, the lower of the two is used. For example, if the indicator on dial #3 were between the 3 and the 4, you would read this as 300 kWh.

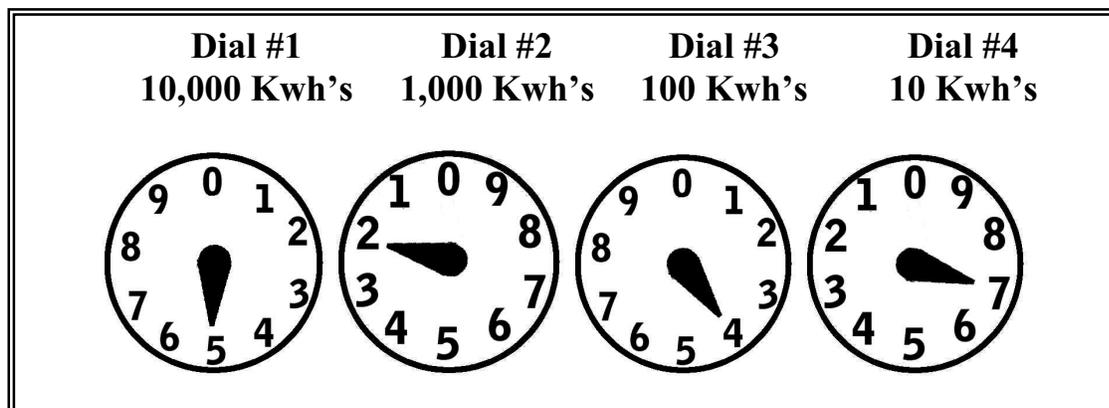
On some meters, all the dials are numbered clockwise (the way a clock is numbered). On other meters, every other dial is numbered in the opposite direction. The first number to the left of the 0 is 9. If this is the case on your meter, don't let it worry you. No matter which way the dials are numbered, the numbers value remains the same. In other words, if the arrow is pointing to a 9, it means 9 no matter which side of the 0 it is on.

Answer the following questions by applying what you have just read.



Read the meter in the example above and record the meter reading in the blank spaces provided. Then write the total number of kilowatt hours recorded on the meter.

Dial #1	Dial #2	Dial #3	Dial #4
Total Number of Kilowatt Hours (Kwh's)			



Read the meter in the example above and record the meter reading in the blank spaces provided. Then write the total number of kilowatt hours recorded on the meter.

Dial #1	Dial #2	Dial #3	Dial #4
Total Number of Kilowatt Hours (Kwh's)			

The numbers on the dials represent the number of kilowatt hours that have been used *since the meter was installed*. The meter is read each month, and the reading from the previous month is subtracted from the current reading to determine how many kilowatt hours have been used in the month (or every two months, depending on when the meter is read).

Question 6

The meter at the Jones residence is read on a bi-monthly basis (once every two months). The meter is read in February and again in April.

- a) Calculate the number of kilowatt hours that have been used in two months.

Date	Kwh
April	59799.0
February	58478.0
Total Kilowatt Hours	

- b) Now calculate the cost of electricity for this residence with a rate of 7¢ per kilowatt-hour. Round off your answer to the nearest cent.

Be sure to write your name, school and the date on the front cover. Check your work and hand in this assignment.

Electrician Apprenticeship Candidates

Demonstration: LBS Level 4 Choosing a Career in the Electrical Trade

Name: _____

School: _____

Date Completed: _____

Learner Name: _____ Date Completed: _____

Demonstration Title: **Choosing a Career as an Electrician**

LBS Level: **4**

Description: Research a career in the construction and industrial electrical trade, and plan the steps needed to achieve the goal.
Main Goal Path: Further education and training.
Short-term Goal: The goal is to improve research and writing skills as well as develop self-direction skills and a greater understanding of the electrical trade at level 4 for entry to an apprenticeship program.
Primary Outcome: Write clearly to express ideas.
Secondary Outcomes: Read with understanding for various purposes.
Materials Required: <ul style="list-style-type: none">• May use word processing software.• Access to the Internet.• Dictionary.
Practitioner Name:
How is this demonstration linked to the learner's goals?
Demonstration Results:
Activity Successfully Completed? <input type="checkbox"/> Yes <input type="checkbox"/> No
Level Successfully Completed? <input type="checkbox"/> Yes <input type="checkbox"/> No

Practitioners Instructions:

1. Make sure the learner understands the information and instructions for this demonstration
2. Go over the evaluation section with your learner to ensure that the learner understands what skills, knowledge or behaviours are being assessed by this demonstration, as well as how they will be evaluated.
3. Discuss with the learner and decide a reasonable length of time for the completion of this demonstration activity. Record this information on the assessment form.
4. When the learner has completed the demonstration, provide a way for the learner to self-reflect on the experience. Complete the assessment form with the learner, and note whether it was successful or needs to be tried again.

Prior Learning Required:

The learner needs to be able to independently read textbooks, charts and diagrams and other forms of text. The learner should be able to conduct research in a library and/or on the Internet, plan a research project, brainstorm and organise ideas for writing, write using paragraph form and appropriate levels of language.

Help Allowed:

- The learner can ask for feedback from peers for editing and proof reading.
- The learner may ask the instructor for guidance in organisation of research and the report.
- The learner may use a dictionary or thesaurus.
- The learner may use a word processing application to produce the report.

Possible Adaptation:

- The topic, scope and breadth of the research can be varied according to the learner's interests and activities.
- Only sections of the rubric may be used, rather than using it in its entirety. Focus may be applied to those aspects of research or writing upon which the learner has been working.
- Learners may wish to interview an electrician or staff at Job Connect or the local community college in addition to text-based research.
- The learner may wish to produce the report using a word processing program. Diagrams, photographs, charts and tables can be added according to the learner's competence with computer technology.
- The learner may wish to make an oral report on this topic. A rubric for oral presentations will be required for this task.

Demonstration Title: Choosing a Career in the Electrical Trade
Assessment Tool: Rubric

LBS Level: 4

	2	3	4	5
Criteria	Falls well below	Approaches	Meets	Exceeds
Research skills	<ul style="list-style-type: none"> needs a great deal of assistance to conduct research <input type="checkbox"/> uses only a few or no research skills <input type="checkbox"/> research notes are incomplete and poorly organised <input type="checkbox"/> 	<ul style="list-style-type: none"> needs some assistance to conduct research <input type="checkbox"/> uses some research skills <input type="checkbox"/> research notes are somewhat complete and somewhat organised <input type="checkbox"/> 	<ul style="list-style-type: none"> requires little assistance to conduct research <input type="checkbox"/> uses most of the required research skills <input type="checkbox"/> research notes are mostly complete and show evidence of some organisation <input type="checkbox"/> 	<ul style="list-style-type: none"> conducts research independently <input type="checkbox"/> uses all of the required research skills <input type="checkbox"/> research notes are complete and well-organised <input type="checkbox"/>
Analytic skills	<ul style="list-style-type: none"> learner has omitted some of the research topics <input type="checkbox"/> responses to analytic questions show a lack of understanding of the task <input type="checkbox"/> some of the information is copied from the source <input type="checkbox"/> 	<ul style="list-style-type: none"> learner does not include factual information <input type="checkbox"/> responses to analytic questions show some understanding of the task <input type="checkbox"/> has difficulty using own words <input type="checkbox"/> 	<ul style="list-style-type: none"> includes factual information on all topics <input type="checkbox"/> clearly explains all topics <input type="checkbox"/> responses to analytic questions clarify personal concerns and evaluate the data <input type="checkbox"/> 	<ul style="list-style-type: none"> includes factual information on all topics and provides additional relevant information <input type="checkbox"/> responses to analytic questions are well thought out and show evidence of problem-solving skills <input type="checkbox"/>

	2	3	4	5
Criteria	Falls well below	Approaches	Meets	Exceeds
<p>Organisation of writing (introduction, body, conclusion, and bibliography)</p>	<ul style="list-style-type: none"> uses a weak introduction and conclusion <input type="checkbox"/> paragraphs are not structured <input type="checkbox"/> the main idea is only partially presented with no supporting detail <input type="checkbox"/> report is illogically organised <input type="checkbox"/> shows no evidence of revision <input type="checkbox"/> does not include bibliography <input type="checkbox"/> 	<ul style="list-style-type: none"> shows evidence of an introduction and conclusion <input type="checkbox"/> information is presented in paragraph form with some supporting details <input type="checkbox"/> logic in organisation is weak <input type="checkbox"/> shows some evidence of self-revision <input type="checkbox"/> incomplete bibliography <input type="checkbox"/> 	<ul style="list-style-type: none"> introduction and conclusion are linked clearly and effectively <input type="checkbox"/> uses well-developed paragraphs and supporting details are used for effect <input type="checkbox"/> logical organisation <input type="checkbox"/> shows evidence of peer revision <input type="checkbox"/> complete bibliography <input type="checkbox"/> 	<ul style="list-style-type: none"> creative and logical organisation of report <input type="checkbox"/> report includes diagrams, charts or graphs <input type="checkbox"/> supporting details are chosen for the best effect <input type="checkbox"/> independently revises work and seeks the opinion of others <input type="checkbox"/> no errors in the bibliography <input type="checkbox"/>

	2	3	4	5
Criteria	Falls well below	Approaches	Meets	Exceeds
Writing style (voice, vocabulary and sentence structure)	<ul style="list-style-type: none"> uses inappropriate voice <input type="checkbox"/> only some variety in sentence structure <input type="checkbox"/> uses only some new words and terminology <input type="checkbox"/> report is difficult to read <input type="checkbox"/> 	<ul style="list-style-type: none"> uses an inconsistent voice in writing <input type="checkbox"/> uses simple and compound sentences for detail uses some specialised terminology found in the reading <input type="checkbox"/> report is generally neat and easy to read <input type="checkbox"/> 	<ul style="list-style-type: none"> voice is appropriate for the purpose <input type="checkbox"/> uses a variety of sentence structures for interest and to provide detail <input type="checkbox"/> uses words to create interest for the reader uses specialised terminology correctly and for effect <input type="checkbox"/> report is neat and easy to read <input type="checkbox"/> uses elements such as insertion of graphics in a word processing application <input type="checkbox"/> 	<ul style="list-style-type: none"> uses voice to connect with the reader and reinforce the purpose of writing <input type="checkbox"/> consciously uses sentence structure and types for a particular effect <input type="checkbox"/> uses vocabulary creatively and for effect <input type="checkbox"/> uses a word processing application to insert graphs, tables and charts <input type="checkbox"/>
Mechanics (grammar, spelling and punctuation)	<ul style="list-style-type: none"> several mechanical errors <input type="checkbox"/> errors interfere with meaning <input type="checkbox"/> requires a lot of assistance to make corrections <input type="checkbox"/> 	<ul style="list-style-type: none"> several minor errors <input type="checkbox"/> errors sometimes interfere with meaning <input type="checkbox"/> revises with some assistance <input type="checkbox"/> 	<ul style="list-style-type: none"> a few errors that do not interfere with meaning <input type="checkbox"/> revises with little assistance <input type="checkbox"/> 	<ul style="list-style-type: none"> practically no errors or error free <input type="checkbox"/> works independently to correct errors <input type="checkbox"/>

The level of performance required for success in this demonstration is

The agreed upon amount of time for the learner to complete this task is

**Research Project:
Level 4: Choosing a Career in the Electrical Trade**

Overview

This project requires you to conduct research on a career in the electrical trade. The goal of the project is to gather information to help you decide whether the electrical trade is the right career for you.

The project is divided into three sections. Section A requires you to research the career and report on your findings. Section B asks you to research the apprenticeship program in Ontario. Section C asks you to analyse the information you have gathered and consider the electrical trade as a career for you.

Sources

There are many sources that you may use to research, including the library, Internet and face-to-face interviews with people working in the field, and career counsellors. Some information about apprenticeships in Ontario is included with this assignment to help you get started.

Since the report requires a bibliography, it is a good idea to keep track of the resources you have used. A sample bibliography is included with this assignment. A list of possible Internet resources is also included with this assignment.

SECTION A

Research the following topics regarding a career in the electrical trade:

1. What are the duties and responsibilities of an electrician?
 2. What are some related occupations?
 3. What are the opportunities for advancement in the field?
 4. What are the educational requirements for the field? What skills do you need?
 5. What are the job prospects for the next five years, and what level of earnings can you expect?
-

SECTION B

Research apprenticeship programs in Ontario. Some information is provided with this assignment. You can find additional information by contacting the Ministry of Training, Colleges and Universities.

Write a summary of your findings, and include the following information:

- What is apprenticeship training?
- What are the entry requirements for the construction electrician apprenticeship program?
- What are the training requirements?
- How much will training cost?
- Is financing available for the classroom portion of training?

SECTION C

Now that you have researched the electrical trade and understand what's in store, answer the following questions:

1. What kind of opportunities do you see for yourself in the electrical trade?
2. What kinds of challenges could you expect to face in this kind of work? How would you deal with them?
3. Is this career a reasonable goal for you? Why or why not?
4. What qualities do you already possess that make you a suitable candidate for this career?
5. What will you have to do to prepare yourself for this career? How long will it take? How much will it cost?
6. How will you fund your education and training as an electrician? What assistance, if any is available?

Your written report must have an introduction, body and conclusion. You may organise your report as you wish. The organisation of this report should allow the reader to follow it easily and to understand the information that you present.

The report must be hand-written or typed, double-spaced and in paragraph form. Use complete sentences with correct grammar, spelling and punctuation. Include a title page (with the title of your report, your name and the completion date), table of contents, and bibliography. You can include diagrams, photographs, charts and tables as you wish.

Hand in your finished report, along with all of your research notes and rough drafts.

Level 4: Choosing a Career in the Electrical Trade Recommended Internet Resources

Contact Point Bulletin

<http://www.contactpoint.ca/bulletin/v5-n1/v5-n1c.html>

Essential Skills Portfolio Developer

<http://portfolio.telecampus.com/>

Find an Occupation in Ontario Job Futures

http://www.on.hrdc-drhc.gc.ca/english/lmi/eaid/ojf/find_profile_e.html

Human Resources Development Canada

<http://www.on.hrdc-drhc.gc.ca/>

List of Essential Skills Profiles

http://www15.hrdc-drhc.gc.ca/english/all_profiles.asp

Ministry of Training, Colleges and Universities, Apprenticeships

<http://www.edu.gov.on.ca/eng/training/apprenticeship/appren.html>

Ministry of Training, Colleges and Universities, Registered Private Vocational Schools

<http://www.edu.gov.on.ca/eng/general/list/pvs01.html>

National Occupational Classification

<http://cnp2001noc.worklogic.com/e/welcome.shtml>

Ontario Student Assistance Program

<http://osap.gov.on.ca/>

Ontario Construction Secretariat

<http://www.iciconstruction.com/Q300/frameset.html>

International Brotherhood of Electrical Workers (IBEW)

<http://63.240.198.132/Project4/apprenticeship.asp>

Electrical Contractors Association of Ontario (ECAO)

<http://www.ecao.org/visitors/apprenticeship.htm>

Apprenticesearch.com

<http://www.apprenticesearch.com/default.asp>

Sample Bibliography

Dreher, Diane. (1992). Explorers who got lost. New York: Tom Doherty Association Book.

Parker, John. (1996). Exploration. In The World Book Encyclopaedia (Vol. 6, pp.449-461).
Toronto, Canada: World Book Inc.

The Hugo award. World Science Fiction Society, September 4, 1998 (accessed July 29, 1999).
<http://www.wsfs.org/hugos.html>

The Macmillan School Atlas (3rd ed.). (1993). Toronto, Canada: Gage Educational Publishing
Company.

Apprenticeship Training in Ontario

What is Apprenticeship Training?

Apprenticeship is a structured system of supervised training that leads to certification in a designated trade, occupation or craft. Most of the training provided by qualified employers in a workplace setting. This gives the apprentice the hands-on training required to learn the trade. . Apprenticeship programs also involve some classroom instruction, normally offered by a community college or approved training centre. About 90 percent of apprenticeship training occurs in the workplace.

What are the benefits of Apprenticeships?

The most important benefit of apprenticeship is that you can earn while you learn. Apprentices are paid for the work that they do while training for certification. The starting wage for apprentices is normally half of what a certified trade person would earn.

Becoming certified in a skilled trade means that you have demonstrated a measure of success and mastery in your field. Your success will be recognised and rewarded, not only by your earnings, but also by the respect of your peers and your industry. Many of the people who work in the skilled trades chose to relocate and work in any province in Canada.

Employers benefit from apprenticeship training as well. By training apprentices employers ensure that they will have the skilled workers they need to meet their customers' demands. This in turn fuels a stronger economy, and leads to increased productivity.

What is the New Apprenticeship and Certification Act?

The Apprenticeship and Certification Act was recently proclaimed by the Government of Ontario. This Act introduces changes in legislation and regulations involving apprenticeship, and sets new standards for delivery of training to apprentices. It expands apprenticeship training to new trades, and increases opportunities for training by broadening the groups that can sponsor apprenticeship training.

The Trades Qualification and Apprenticeship Act will continue to govern training for skilled trades in construction, at the request of the industry.

These changes have affected the entry requirements for some skilled trades. For more information about these changes and how they may affect you, contact your local Ministry of Training Colleges and Universities Apprenticeship office or check out the New Releases at www.edu.gov.on.ca

How do I Become an Apprentice?

As an apprenticeship candidate, it is your responsibility to find an employer willing to hire and train you. Once you and employer have reached an agreement, you can jointly arrange a meeting with an MTCU Training Consultant to determine the employer's ability to train the apprentice.

If the employer qualifies, you will be registered as an apprentice by signing a contract called an Apprenticeship Agreement. Once the agreement is signed, training can begin.

Once you have completed on-the-job and classroom training, and can demonstrated that you can meet the standards established for the trade, you will write an exam for certification. Successful candidates are issued a Certificate of Apprenticeship and a Certificate of Qualification by MTCU.

The entry requirements and duration of training for Apprenticeship programs vary according to the specific trade. For more information about the trade that interests you, go to the MTCU Apprenticeship web site.

Electrician Apprenticeship Candidates

Demonstration: LBS Level 5 Taking Entry Level Tests

Name: _____

School: _____

Date Completed: _____

Learner Name: _____ Date Completed: _____

Demonstration Title: Taking Entry Level Tests

LBS Level: 5

Description: Complete a multiple-choice test similar to those encountered in preparation for in-class apprenticeship training. Learn about test anxiety and test-taking skills and take a practice test.
Main Goal Path: Further education and training.
Short-term Goal: The goal is to improve reading and math skills at level 5 for entry to an apprenticeship program.
Primary Outcomes: Communications Test: Read with understanding for various purposes. Math Test: Perform basic operations with numbers. Use measurement for various purposes. Solve geometric problems. Manage data and probability. Use patterning and algebra.
Secondary Outcomes:
Materials Required: <ul style="list-style-type: none">• HB pencil and eraser.• Scrap paper for rough work.• Practice Test on Test Anxiety and Multiple Choice Tests.
Practitioner Name:
How is this demonstration linked to the learner's goals?
Demonstration Results: Activity Successfully Completed? <input type="checkbox"/> Yes <input type="checkbox"/> No Level Successfully Completed? <input type="checkbox"/> Yes <input type="checkbox"/> No

Practitioners Instructions:

1. Make sure the learner understands the information and instructions for this demonstration
2. Go over the evaluation section with your learner to ensure that the learner understands what skills, knowledge or behaviours are being assessed by this demonstration, as well as how they will be evaluated.
3. Discuss with the learner and decide a reasonable length of time for the completion of this demonstration activity. Record this information on the assessment form.
4. When the learner has completed the demonstration, provide a way for the learner to self-reflect on the experience. Complete the assessment form with the learner, and note whether it was successful or needs to be tried again.

Prior Learning Required:

See attached Communications and Mathematics Academic Skills Inventory from the Workplace Support Services Branch, MTCU.

It is strongly recommended that the learner have an opportunity to complete the *Practice Test* before attempting the Communications and Mathematics Skills Tests.

Help Allowed:

- None

Possible Adaptation:

- The reading and math tests may be taken in two sessions, if concentration or fatigue are an issue.
- Instructors may wish to ask learners to complete specific questions that relate to learning that has taken place, rather than asking the learner to complete the whole test.
- In addition to demonstrating the learner's competency in taking multiple-choice tests, the test results may indicate areas of weakness in communication and numeracy skills where the learner would benefit from additional work. When reviewing test results with the learner, point out the specific areas of reading and math that require review.

Demonstration Title: Taking Entry Level Tests

LBS Level: 5

Skills Embedded in the Task		
Learning Outcomes	Skill Sets	Success Markers
Read with understanding for various purposes	Decoding skills	<ul style="list-style-type: none"> • decodes new vocabulary independently in most materials, applies a full range of efficient reading techniques
	Comprehension enhancement skills	<ul style="list-style-type: none"> • selects appropriate reading strategies (for example, skims text for specific information; scans text to determine the purpose of the text or the type of material; monitors own comprehension)
	Read and comprehend	<ul style="list-style-type: none"> • reads independently • reads from a wide variety of fiction and non-fiction materials for different purposes
	Read and retell	<ul style="list-style-type: none"> • identifies the main ideas in information materials, explains how the details support the main idea, <u>and</u> questions and evaluates the ideas in the material • describes a series of events in a written (fiction or non-fiction) work using evidence from the work
	Read and Interpret	<ul style="list-style-type: none"> • continues to make judgements and draws conclusions about ideas in written materials on the basis of evidence from the materials (level 5) • distinguishes between logical and illogical arguments, objectivity and prejudice (level 4)
	Read to find information and for research	<ul style="list-style-type: none"> • continues to use conventions of formal text to locate and interpret information (including selecting information from a line graph)

Learning Outcomes	Skill Sets	Success Markers
Perform basic operations with numbers	Add and Subtract	<ul style="list-style-type: none"> • adds and subtracts rational numbers in any form (integers, fractions, decimals, percents); applies to practical situations
	Multiply and divide	<ul style="list-style-type: none"> • demonstrates proficiency in calculations involving whole numbers, fractions, decimals, percents, integers, ratios and rate, powers and square roots and uses in problem-solving • understands and applies the order of operations (up to 3 operations in evaluating expressions) • multiples and divides simple fractions and integers
	Construct and use fractions, decimals, ratios and percents	<ul style="list-style-type: none"> • uses integers, ratio and rate, percents, powers and square roots appropriately and correctly in problem solving
	Use roots and exponents	<ul style="list-style-type: none"> • evaluates and interprets power with integral bases and integral exponents • simplifies expressions involving multiplication, division and powers of powers • finds the approximate values of square roots of whole numbers using a calculator • uses trial and error to estimate the square root of a non-perfect square

Learning Outcomes	Skill Sets	Success Markers
Use measurement for various purposes	Linear measurement	<ul style="list-style-type: none"> • selects the most appropriate standard unit to measure linear dimensions and the perimeter of irregular polygons
	Measurement of perimeter and area	<ul style="list-style-type: none"> • estimates and calculates the radius, diameter, circumference and area of a circle, using a formula in a problem-solving context • estimates and calculates the perimeter and area of rectangles and squares (level 3)
Solve geometric problems	Three- and two-dimensional geometry	<ul style="list-style-type: none"> • solves angle measurement problems involving properties of intersecting line segments, parallel lines and transversals • applies the Pythagorean relationship to numerical problems involving area and right-angle triangles • explains why the sum of the angles of a triangle is 180°
Use patterning and algebra		<ul style="list-style-type: none"> • translates complex statements into algebraic expressions or equations • solves and verifies first-degree equations with one variable, using various techniques involving whole numbers and decimals • interprets the solution of a given equation as a specific number value that makes the equation true

**Additional Skills
Communications and Mathematics Academic Skills Inventory**

The following list of skills is taken from the *Evaluating Academic Readiness for Apprenticeship Training*¹ (EARAT) under *Academic Skills Inventory for Construction & Maintenance and Industrial Electrician Apprentices*. These are skills not specifically listed in the LBS Learning Outcomes, but are skills that learners will need to successfully complete the demonstration activity. **NB: The demonstration activity is linked to LBS Level 5 skills, and is an appropriate for learners at that level.**

COMMUNICATIONS	
Communication Skill	Skill Descriptor
Vocabulary/Word Attack Skills	Define or identify correct usage of trade-related or trade-specific terminology.
Sequencing	Identify errors in sequencing or information; insert new information into the correct place in a given sequence.
Restatement/Rephrasing	Identify restatement of information; translate non-narrative information into narrative descriptors.
Interpretation of Diagrams	Identify correct interpretation of a diagram; identify most appropriate diagram representation of information presented in narrative material.
Detail Extraction	Select specific details from passage or non-narrative reading material.
Classification	Select information based on given criteria; identify information that matches given criteria; based on specific attributes, identify categorical grouping for several pieces of information; identify errors in groupings based on specific attributes.
Evaluation of Information	Distinguish between statements of cause and statements of effect; distinguish between statements of fact and statements of opinion.

¹ Workplace Support Services Branch, Ministry of Training, Colleges and Universities

Comparisons & Contrast	Identify similarities and differences between two bodies of information; select most appropriate response among several alternatives based on given criteria; identify errors in comparisons based on given criteria.
Making Predictions	Identify most probable outcome of a given body of information; identify conditions necessary for a given outcome to occur; identify most probable effect of additional information on a given body of information; identify reason(s) why a given outcome is not probable.
Synthesis of Information	Combine several pieces of information within the body of the given material for the purpose of classification, evaluation, comparison, drawing conclusions or making a prediction; combine several pieces of information within the body of the material with new information for the purpose of classification, evaluation, comparison, drawing conclusions or making a prediction; prioritise several pieces of information; identify a pattern found in several pieces of information.

MATHEMATICS	
Communication Skill	Skill Descriptor
Imperial Measurement	Express linear measures in appropriate unity; perform calculations with linear measures; convert imperial linear measurement to equivalent imperial units (e.g. inches to feet).
Metric Measurement	Express linear measures in appropriate units; perform calculations with linear measures; identify relative sizes of metric prefixes; convert metric measurement to equivalent units within the metric system.
Imperial/Metric Conversion	Convert metric linear measurement to imperial measurement (given base equivalencies); convert imperial linear measurement to metric measurement (given base equivalencies).
Interpretation of Graphs	Select information from a line graph.

Demonstration Level 5: Taking Entry Level Tests
Practice Test Answer Sheet

- 1d) All of the above.
- 2d) $\frac{75}{95}$
- 3a) Answering only those questions where the answer is known.
- 4b) May suffer from a variety of physical, emotional and psychological symptoms.
- 5d) You should spend time talking to your friends about the exam just before you write it.

**Demonstration Level 5: Taking Entry Level Tests
Communication Skills Answer Sheet**

- | | |
|---|--|
| 1d) 17 mA | 13b) doorbell assembly |
| 2a) The flow or rate of flow of an electric charge. | 14b) Connect the transformer to the power source. |
| 3c) The Causes and Effects of Electric Shock. | 15c) 18-gauge doorbell wire. |
| 4b) Interrupt the flow of current at the circuit breaker to prevent getting a shock yourself. | 16c) Very little formal education. |
| 5d) Ventricular fibrillation occurs at 50 mA. | 17c) 0.05 amps |
| 6c) A discrepancy of 5 miliamperes or more. | 18a) Voltage is inversely proportional to the value of resistance. |
| 7b) Protect all the appliances, light fixtures and receptacles on the protected branch circuit. | 19b) Watts. |
| 8d) Ground Fault Circuit Interrupters. | 20d) $R = \frac{V}{I}$ |
| 9c) Locates damage to extension cords. | 21d) 1990 |
| 10c) Portable plug-in. | 22b) Hydro plants emit no atmospheric pollutants. |
| 11d) The voltage from the power source to the transformer is higher than the voltage from the transformer to the doorbell assembly. | 23d) Hydroelectricity. |
| 12b) To change 120 volt current from the power source to 24 volt current. | 24a) A pipe that carries water to the turbine. |
| | 25d) 97% of the current total electricity production comes from hydroelectricity |

**Demonstration Level 5: Taking Entry Level Tests
Mathematics Skills Answer Sheet**

1c)	421,824	24b)	23 litres
2b)	1,434	25d)	96 km
3d)	33	26b)	2.5 inches
4b)	57.04	27c)	3.652 kg
5b)	20 feet, 3 inches	28a)	$\frac{5}{16}$
6c)	30.655	29d)	0.9
7a)	$\frac{2}{5}$	30d)	\$957.60
8b)	$\frac{8}{9}$	31b)	3.5 m
9b)	$1\frac{5}{12}$	32d)	$ac + ab$
10a)	$3^2 + 2^3$	33b)	8 feet
11b)	100,000	34d)	8 feet, 2 inches
12a)	0.001	35a)	$R_3 = R - R_1 - R_2$
13d)	36,741	36c)	7 feet, 5 inches
14d)	10^8	37a)	14,400 KB
15c)	\$28.56	38c)	77
16d)	25%	39b)	12 feet
17c)	3%	40a)	3 metres
18c)	12	41d)	7 ft
19a)	51 inches	42c)	360°
20b)	29 panels	43b)	50.24 m^2
21b)	$\frac{5}{8}$	44d)	12 feet
22c)	\$21.19	45b)	45°
23a)	1 : 2		

Demonstration Level 5: Taking Entry Level Tests

Overview

This is a multiple-choice test that is similar to those you might encounter while preparing for entry to an apprenticeship-training program such as Construction Electrician. It may also be similar to the kinds of testing that you will encounter during the in-class portion of apprenticeship training.

This test measures your skills in communications (mainly reading) and mathematics, as well as problem solving and decision-making. The questions on the test reflect the skills that are required for taking in-class training in an apprenticeship program, but they have been adjusted to the Literacy and Basic Skills Learning Outcomes for Level 5.

In order to be successful on this test, you will need to have skills in communications and mathematics at LBS Level 5. Your instructor has a list of the specific communications and mathematics skills that you will need to complete this test. Before attempting the test, you should feel confident about your skills in these areas.

Specific knowledge about the electrical trade is not necessary for successful completion of this test. In the communications section, reading passages contain information about the electrical trade. You will only require the information contained in the reading passages to answer the questions. The section on mathematics contains generic questions, as well as questions that are specific to the construction and electrical trades. Again, any information that you need to answer the question is contained in the question itself.

Possible Variations

This test may be completed in one session, or you may choose to do the communications test in one session and the mathematics test in another.

While there is no time limit set for this demonstration activity, the exams that you will encounter in the in-class portion of your training will be timed. You may wish to negotiate a time limit with your instructor before you begin the test.

You and your instructor might also decide to eliminate some of the questions on either part of the test if they involve skills that have not been covered in your learning program. However, if you choose this variation, you should consider working on the skills that have not yet been mastered in your learning program. You could then complete this demonstration activity when you feel that you are prepared to complete the whole test.

A practice test is included with this demonstration activity. The reading passage lists suggestions for coping with multiple-choices tests and test anxiety. You might wish to either take the practice test or at least read over the information before you begin the actual test.

Process

1. Read over the list of embedded communication and mathematics skills before completing the demonstration activity. Discuss with your instructor whether you are ready to attempt the demonstration activity.
2. Read over the sample test covering test anxiety and taking multiple-choice tests. You may wish to try taking the test before you begin the demonstration activity. If you take the practice test, discuss the results with your instructor before beginning the demonstration activity.
3. Decide with your instructor whether you will do both sections of the test in one session, or if you will take two sessions to complete it. Also agree on a time limit for taking the test.
4. Read all of the instructions for the test before beginning.
5. Complete the identification section on the Answer Sheet before beginning the test.

Resources Allowed

- HB pencil
- Extra paper for rough work (especially for the mathematics test)
- Practice Test on Test Anxiety and Multiple Choice Tests

**LITERACY AND BASIC SKILLS
PROGRAM**

PRACTICE TEST

FOR

**CONSTRUCTION & MAINTENANCE/
INDUSTRIAL ELECTRICIAN
APPRENTICES**

JUNE 2002

Test Anxiety and Multiple Choice Tests

What is test anxiety?

Most students have experienced a degree of test anxiety at one time or another. In fact, to some extent test anxiety can improve test-taking performance. It also shows that the individual takes the test seriously and cares about the results. But, when anxiety is frequent and severe, it can negatively affect test scores, and create feelings of frustration, failure and low self-esteem.

Test anxiety is an unpleasant emotional state that is characterised by feelings of tension, apprehension and worry, and sometimes by physical symptoms associated with these feelings. Some of the symptoms include:

- physical symptoms, such as headaches, nausea, faintness, feeling too hot or too cold, etc.;
- emotional symptoms, including wanting to cry or laugh too much, or feeling frightened, angry or helpless; and,
- cognitive problems, such as blanking out, having racing thoughts that don't relate to the test material, or uncontrollable thoughts about failure, and distractibility.

What can you do to control test anxiety?

Most people can learn to cope with test anxiety by following these suggestions.

Before the Exam

1. Be well prepared for the test. Study throughout the term, rather than cramming your study time in to a few short days.
2. Include as much self-testing in your studying as possible. Take practice tests if you can.
3. Maintain a healthy lifestyle: get enough sleep, good nutrition, exercise, some personal free time, and a reasonable amount of time for socialising.
4. Give yourself positive messages like, "I can do OK on this exam." or "I *have* studied and I *do* know my stuff."
5. Control negative thoughts. Don't compare yourself to your peers or think about what your parents, partner, children, or others may say about your performance on this exam.

6. Collect all the materials that you will need for the exam on the night before: pen, pencil, ruler, eraser, calculator, etc. Double-check the time of the exam and the location.
7. Set the alarm clock and then get a good night's sleep before the exam.

Taking the Test

8. Get to the exam in plenty of time. Don't talk to friends about the contents of the exam before going in to take the test.
9. If possible sit somewhere in the exam room where there is little or nothing to distract you.
10. Before you begin writing the test, close your eyes and taking some slow deep breaths to help calm you.
11. Read any instructions on the top page carefully before beginning to write.
12. As you work, focus only on the exam, not on what other students are doing.
13. If you feel anxious during the test, take a few minutes to calm yourself down. Stretch your arms and legs and then relax them again. Take some slow deep breaths. Give yourself positive messages: "I will be OK, I can do this." When you feel more relaxed, get back to the exam.
14. If the exam is more difficult than you expected, keep your focus and do the best you can. Partial marks are better than none at all.

After the Exam

15. Reward yourself. Take in a movie with a friend if you have time. If you have other exams to study for, postpone a larger treat, and take a little time to have coffee with a friend, go for a walk, or watch your favourite television show.
16. Try not to worry about your performance on the test.

If after following these suggestions you still experience test anxiety, talk to a counsellor and share your concerns.

Taking Multiple Choice Tests

Many students think of multiple choice exams as simply a matter of recognising true statements. However, these exams require students to do much more than just recognising textbook material.

Multiple choice questions require you to make distinctions between correct and almost correct

statements. This distinction makes use of higher order thinking skills like synthesis, analysis, and application, and require the student to read both the question and the choices carefully.

Multiple-choice questions consist of three parts:

- a stem, which asks a question, poses a problem, or presents an incomplete sentence,
- the correct answer, and
- a number of "distracters" or "seductive" alternatives.

Your challenge is to identify the correct or the most-correct answer from among the alternatives.

Some students are more *test-wise* than others are when it comes to multiple choice tests. *Test-wiseness* is the ability to use the characteristics and format of a test to improve test-taking performance.

Multiple choice questions often include clues that may help you locate the correct answer. You can improve your performance on these tests by following some simple suggestions.

Studying for the Exam

1. Take a study skills workshop to learn how to recognise various levels of learning, learning strategies and how to learn, remember and think better.
2. Practise making and answering multiple choice questions of various levels.
3. Study old exams and look at the level or type of thinking that is required, and the degree of difference between correct and incorrect choices.
4. When studying look for groups of facts or ideas that are similar in meaning. Pay attention to the differences among the facts and ideas within each group.

Writing multiple choice exams

1. Read all of the instructions at the top of the exam page first. Make sure that you follow the instructions while writing the test.
2. Some students read the all the exam questions first, answer the ones that they are sure of, and mark the ones that appear more difficult so they can remember to answer those later. This allows them to manage their time more effectively.
3. When reading the stem (question):

- read the stem carefully;
 - circle the key words or phrases;
 - pay attention to negative or qualifying words like *never*, *always*, *some*, *many or few*. These can affect the answer
 - cover the choices, and try to answer the question.
4. When looking at the alternatives (choices):
 - uncover one alternative at a time
 - read the stem followed by the alternative to see if it *sounds* right; or if the alternative makes grammatical sense with the stem;
 - assign a *yes*, *no* or *maybe* to each alternative. If you end up with only one *yes* response, this is probably the correct answer.
 5. If you don't end up with a clearly correct choice, use the process of elimination. :
 - Which choice seems *most* correct?
 - Look at negatives and qualifiers to see if they have affected the meaning of the alternative.
 - Consider "*all of the above*" and "*none of the above*." to see if all of them or none of them apply *totally*.
 - Make sure that a statement applies to the question since it can be true, but not be relevant to the question at hand.
 - If you are still unsure, move on and come back to the question later. You may find helpful clues in another question.
 6. If you still have unanswered questions when you're finished, take a guess at the answers **unless** marks are deducted for wrong answers.
 7. Leave time at the end of the exam to check over your work. Make sure that you haven't missed any questions.
 8. Don't look for patterns in your answer. Just because you answered *b*) then *c*) in the last two questions does *not* mean that the next answer will be *d*).
 9. Research has shown that changing your answer once you've answered it is neither good nor bad. If you think you have made a mistake, change the answer to the more correct response.

After the exam has been marked

1. Look at each correct answer. Think about how you studied for that question. Use that method more often! Give

- yourself a pat on the back for getting the answer right!
2. Look at your mistakes in order to understand the fine distinction between the right choice and the choice that you made. Ask yourself why the correct answer is correct and why the choice you made was not.

Here are some practice multiple choice questions that will help you apply what you've learned.

1. Some instructors mark multiple-choice tests by counting the number of correct answers. If a test contained 100 questions and a student answered 80 of them correctly, the final mark *could* be expressed as

- a) $\frac{80}{100}$
b) .80
c) 80%
d) all of the above

2. Other instructors mark multiple-choice tests by *subtracting* the total number of errors from the total number of correct answers. If a test contained 100 questions and a student answered 85 of them correctly and left 5 questions blank, what would the final score be? (blank answers are not counted)

- a) $\frac{85}{100}$

- b) $\frac{15}{100}$
c) $\frac{70}{95}$
d) $\frac{75}{95}$

3. If an instructor marks multiple choice tests by subtracting incorrect answers from correct answers, students writing the test would be better off
- a) answering only those questions where the answer is known
b) taking a guess at unknown questions
c) ask the teacher for help
d) pick a new instructor
4. People who suffer from test anxiety
- a) always get sweaty palms
b) may suffer from a variety of physical, emotional and psychological symptoms
c) never feel anger
d) almost always do well on tests
5. Which of the following statements is *not* true?
- a) You should get a good night's sleep before an exam.
b) Getting involved with a study group is a good idea.
c) Taking practice tests is a good way to study for exams.
d) You should spend time talking to your friends about the exam just before you write it

**Mathematics for Construction & Maintenance/Industrial Electrician Apprentices
Answer Sheet**

Student Name: _____
School: _____
Date: _____

Instructions:

1. Clearly print your name, school and the date in the space provided.
2. Mark your choice for each answer by completely filling in the appropriate space like this with an HB pencil.
3. *Do not write on this test paper. Scrap paper will be provided for rough work.*

Answers for Mathematics Test Questions

1. a b c d
2. a b c d
3. a b c d
4. a b c d
5. a b c d

**LITERACY AND BASIC SKILLS
PROGRAM**

DIAGNOSTIC ASSESSMENT

COMMUNICATION SKILLS

For

**CONSTRUCTION AND
MAINTENANCE/INDUSTRIAL
ELECTRICIANS**

JUNE 2002

COMMUNICATION SKILLS

**FOR CONSTRUCTION & MAINTENANCE/INDUSTRIAL
ELECTRICIAN APPRENTICES**

This assessment has been developed to evaluate the academic skills that are necessary in the in-school portion of Apprenticeship Training for Construction and Industrial Electricians. The questions in this paper reflect the skills required for lessons, assignments and tests that the apprentices take. The Academic Skills Inventory, which forms the basis for this assessment, was taken from the “Evaluating Academic Readiness for Apprenticeship Training” (EARAT) test published by the Ministry of Training, Colleges and Universities (MTCU). The Literacy and Basic Skills (LBS) Learning Outcomes were used to create a list of specific communication skills that a Construction & Maintenance/Industrial Electrician apprentice needs.

The results of this evaluation are intended for use as a Counselling Tool to allow people to make informed career and preparatory training decisions.

INSTRUCTIONS

5. Clearly print your name, school and the date on the Answer Sheet.
6. Read each passage carefully.
7. Based on the information in the passage, choose the best answer for each question.
8. Mark your choice on the answer sheet by completely filling in the appropriate space like this with an HB pencil. *Do not write on this test paper. Scrap paper will be provided for rough work.*

Questions #1 - 5 are based on the following passage and the chart below.

Electrical shock occurs when a person comes in contact with two conductors of a circuit or when the body becomes part of the electrical circuit. In either case, a severe shock can cause the heart and lungs to stop functioning. Also, severe burns may occur where current enters and exits the body.

When it comes to electric shock, it's not the voltage but the current that kills. One hundred volts of alternating current (AC) can kill, but so can as little as 42 volts of direct current (DC). The real measure of a shock's intensity lies in the amount of current, measured in milliamperes (mA), that is forced through the body. Any electrical device used on a house wiring circuit—an electric drill, hairdryer, toaster or radio—can transmit a fatal amount of current, given the right circumstances. The chart below shows the effects of various currents.

At any point below 20 mA, breathing becomes laboured: breathing ceases entirely even at values below 75 mA. As the current approaches 100 mA an uncoordinated

twitching of the walls of the heart's ventricles (ventricular fibrillation) occurs. If breathing stops, artificial respiration is required to get the victim breathing again. If the heart is not beating, cardiopulmonary resuscitation (CPR) is necessary.

In any case, prevention is the best medicine for electrical shock. Electrician's apprentices should have a working knowledge of the principles of electricity, respect all voltages, and follow all safety policies and procedures. Apprentices should also be encouraged to take a basic course in CPR (cardiopulmonary resuscitation) so they can aid a co-worker in emergency situations.

	Readings	Effects
Safe Current Values	1 mA or less	Causes no sensation - not felt.
	1 mA to 8 mA	Causes a sensation of shock, but is not painful. Muscular control is not lost, so the person can let go at will.
Unsafe current values	8 mA to 15 mA	Causes a painful shock. Muscular control is not lost and the person can let go at will.
	15 mA to 20 mA	Causes a painful shock. Control of adjacent muscles is lost; and the victim can not let go.
	50 mA to 100 mA	Ventricular fibrillation - a heart condition that can result in death - is possible at this level.
	100 mA to 200 mA	Ventricular fibrillation occurs.
	200 mA and over	Causes severe burns and severe muscular contractions. Contractions are so severe that chest muscles clamp the heart and stop it for the duration of the shock. (This prevents ventricular fibrillation).

1. A co-worker has received an electric shock from an unsafe power tool. Although she appears to be in a great deal of pain, she does not let go of the tool. What is the voltage reading likely to be?
 - a) 8 mA
 - b) 10 mA
 - c) 5 mA
 - d) 17 mA
2. In the first paragraph what does the word **current** mean?
 - a) the flow or rate of flow of an electric charge
 - b) occurring at the present time
 - c) the swiftest part of the stream
 - d) generally accepted or prevalent at the moment
3. What is the best title for this passage?
 - How Electricity Kills
 - First Aid for Electric Shock
 - The Causes and Effects of Electrical Shock
 - On-the-job Safety
4. What is the most logical first step when giving first aid to a victim of electric shock who has stopped breathing?
 - a) Check to see if the victim is breathing.
 - b) Interrupt the flow of current at the circuit breaker to prevent getting shocked yourself.
 - c) Begin artificial respiration or CPR immediately.
 - d) Call for emergency medical aid.
5. Which of the following statements about ventricular fibrillation is *not* true?
 - a) Ventricular fibrillation is an uncoordinated twitching of the walls of the ventricles.
 - b) Ventricular fibrillation occurs at 100 to 200 mA.
 - c) Ventricular fibrillation can be fatal.
 - d) Ventricular fibrillation occurs at 50 mA.

assessment continues on the next page...

Questions #6 – 10 are based on the passage and diagram below.

A ground fault occurs when an unintentional path is created between a source of current, such as a damaged electrical cord and the ground. Human beings can provide that path. The result can be a burn, shock or electrocution.

Ground-fault circuit interrupters (GFCI) protect against shock by measuring the current going into an appliance and coming out. Any discrepancy between the two indicates that electricity is passing where it shouldn't - for instance, from a faulty electrical cord, extension cord or appliance.

The GFCI constantly monitors electricity flow in a circuit. When the GFCI detects leaking current, it switches off power before serious injury or damage can occur. A difference of only 5 milliamperes (5 thousandths of an ampere) is enough to trigger a GFCI.

There are three types of GFCI's: The *receptacle GFCI* is used in place of the standard duplex receptacle. It fits into the standard outlet box. Most GFCI's can be installed so that they also protect other electrical outlets further downstream in the branch circuit.

The *circuit breaker* GFCI is used in buildings that have circuit breakers rather than fuses. The GFCI is installed in a panel box to give protection to selected circuits. This type serves a dual purpose: it shuts off electricity in the event of a ground-fault, as well as when a short-circuit or overload occurs. The ground-fault protection covers both the wiring and each individual outlet, lighting fixture or appliance served by the branch circuit protected by the GFCI.

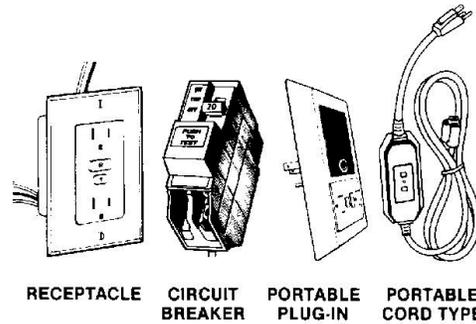
Portable GFCI's are used when working outdoors, or in other situations when a permanent GFCI is not practical. These can take two forms: either a single outlet adapter or an extension cord and GFCI combined.

GFCI protection is required, by code, for most outdoor receptacles, bathroom receptacle circuits, garage wall outlets, kitchen receptacles, and all receptacles in crawl spaces and unfinished basements.

The *Regulations for Construction Projects* (Ontario Regulation 213/91) make

ground-fault circuit interrupters (GFCI's) mandatory whenever portable electrical tools are in use outdoors or in wet locations. In this case, the GFCI shall be installed at the receptacle or on the circuit panel. (Section 192)

Furthermore, when a ground-fault is detected it is the worker's responsibility to locate and repair the cause. According to the regulations, "A ground fault that may pose a hazard shall be investigated and removed without delay." (Section 193)



6. If the GFCI is tripped, this usually indicates

- a) a discrepancy of 3 milliamperes;
- b) a discrepancy of less than 5 milliamperes
- c) a discrepancy of 5 milliamperes or more
- d) a discrepancy of 25 milliamperes or more

7. A GFCI that is installed at the circuit breaker panel

- a) Can only be used outside and in wet areas
- b) protect all the appliances, light fixtures and receptacles on the protected branch circuit
- c) protect only bathroom areas
- d) are regulated for use only with electric power tools

8. What is the best title for this passage?

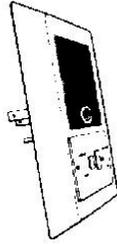
- a) Preventing Electric Shock
- b) Electrical Safety Codes
- c) The Flow of Electricity
- d) Ground-Fault Circuit Interrupters

9. Which of the following is *not* a feature of GFCI's?

- a) detects discrepancies in current flow
- b) protects from electric shock
- c) locates damage to extension cords
- d) shuts electricity flow off when a discrepancy is detected

10. The diagram to below is an example of a

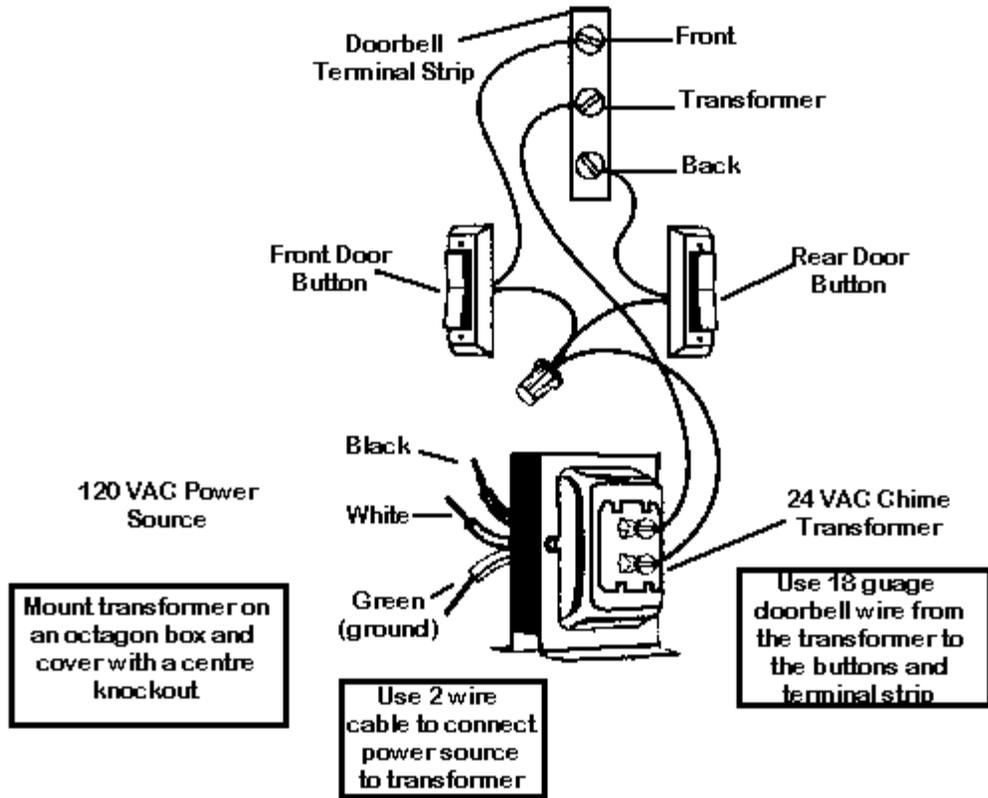
- a) receptacle GFCI
- b) circuit breaker GFCI
- c) portable plug-in GFCI
- d) portable cord type GFCI



assessment continues on the next page..

**QUESTIONS #11 – 15 ARE BASED ON THE
DIAGRAM BELOW**

Doorbell Installation



QUESTIONS ARE ON THE FOLLOWING PAGE

11. Which of the following statements is true?
- a) The voltage from the power source to the transformer is lower than the voltage from the transformer to the doorbell assembly.
 - b) The front and rear buttons are connected directly to the power source.
 - c) The transformer is connected to the power source via the doorbell assembly.
 - d) The voltage from the power source to the transformer is higher than the voltage from the transformer to the doorbell assembly.
12. What is the *main* function of the transformer?
- a) To conduct electricity from the power source to the doorbell assembly
 - b) To change 120 volt current from the power source to 24 volt current.
 - c) To change the 24 volt current to 120 volt current.
 - d) To connect the front and rear buttons to one another.
13. The terminal strip is part of the
- a) transformer
 - b) doorbell assembly
 - c) front door button
 - d) power source
14. When installing a doorbell, the following sequence of events occurs:
1. *Turn off the power at the main power panel.*
 2. *Install the transformer on an inside closet wall, using a covered octagon box with a centre knockout.*
 3. *Install the doorbell assembly on an inside wall.*
 4. *Install the positive (hot) wire from the transformer to the terminal strip on the doorbell assembly.*
 5. *Install the positive (hot) wire from the terminal strip on the doorbell assembly to the front and rear doors.*
 6. *Connect the ground wires from the transformer, and the front and rear doors using a wire nut.*
 7. *Install the front and rear buttons, and connect them to the wires at the doors.*

What should be done next?

- a) Test the front and rear buttons to see if the doorbell works.
 - b) Connect the transformer to the power source.
 - c) Attach the cover to the octagon box.
 - d) Turn on the power at the main power panel.
15. The wire from the front and rear buttons to the terminal strip should be
- a) 2-wire cable
 - b) 3-wire cable
 - c) 18-gauge doorbell wire
 - d) 24-gauge doorbell wire

assessment continues on the next page

Questions 16 – 20 are based on the passage and diagram below.

Georg Simon Ohm was born in Erlangen, Bavaria (now Germany) in 1789. His father, a self-educated locksmith, provided Ohm's early training in mathematics, physics, chemistry and philosophy. In 1805, following a rather spotted and lacklustre formal education, Ohm became a teacher and researcher in mathematics and physics. In 1827, Ohm published his now famous theory of electricity. His theory is now known as Ohm's Law.

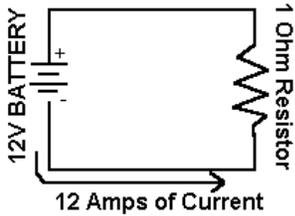
Ohm's Law outlines the relationship between current, electromotive force and resistance, which is now considered to be the basic law of current flow. Voltage is the electrical force, or "pressure", that pushes electrical current to flow through a circuit. It is measured in VOLTS (V or E). Current is the movement of electrical charge - the flow of electrons through the circuit. Current is measured in AMPERES (AMPS, A or I). Resistance is anything that causes an opposition to the flow of electricity in a circuit. It is used to control the amount of voltage and/or amperage in a circuit. Everything on the circuit, lights, appliances, even the wire itself, causes a resistance. It is measured in OHMS (Ω).

Ohm's Law states that "The amount of current (amps) flowing in a circuit made up of pure resistances is directly proportional to the electromotive (voltage) forces impressed on the circuit and inversely proportional to the total resistance (Ohms) of the circuit." In other words, in a complete circuit with constant resistance, a steady increase in voltage produces a constant linear rise in current. By the same token, a steady increase in resistance, in a circuit with constant voltage, produces a progressively (non-linear) weaker current. This can be expressed as a simple formula:

$$V = I X R$$

where **V = Voltage, I = Current, and R = Resistance.**

This formula can be used to calculate an unknown value in a simple (complete) circuit. For example, in the diagram below, there is a current of 12 amps (12A) and a resistive load of 1 Ohm (1Ω). The voltage can be determined using Ohm's Law.



$$V = 12A \times 1 \Omega$$

$$V = 12$$

$$I = V \div R$$

$$I = 12 \div 1$$

$$\underline{I = 12}$$

If the voltage of the battery was known, and there was a resistive load of 1 Ohm placed in the series, the current would be

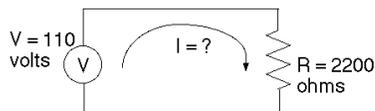
Or, if the voltage and the current are known, then it is possible to calculate the amount of resistance in the circuit.

$$R = V \div I$$

$$R = 12 \div 12$$

$$R = 1 \Omega$$

16. Ohm's father likely had
- university degree
 - some university training
 - very little formal education
 - more than 10 years of format education
17. A 110 volt wall outlet supplies power to a strobe light with a resistance of 2200 ohms. How much current is flowing through the strobe light?



- 0.5 amps
- 2.0 amps
- 0.05 amps
- 1.0 amp

18. Which of the following statements is *not* true?
- Voltage is inversely proportional to the value of resistance
 - Voltage is directly proportional to current
 - Current is inversely proportional to resistance
 - Voltage and Resistance are always equal
19. Which of the following is *not* a variable in the equation described in this passage?
- voltage
 - watts
 - resistance
 - amperes
20. Which of the following equations would you use to calculate the amount of resistance in a simple circuit?
- $V = I \times R$
 - $I = \frac{V}{R}$
 - $R = V \times I$
 - $R = \frac{V}{I}$

assessment continues on the next page

Questions 21 – 25 are based on the passage and graph below.

Hydroelectric power is a timeless, renewable resource that fuelled Ontario's economic growth in the first half of the twentieth century.

Hydroelectric power plants convert the kinetic energy contained in falling water into electricity.

Most hydroelectric stations use either the natural "drop" of the river or build a dam across the river to raise the water level and provide the drop needed to create a driving force. Water at the higher level (the forebay) goes through the intake into a pipe, called a penstock, which carries it down to the turbine.

The turbine is connected to a generator. When the turbine is set in motion, it causes the generator to rotate, and electricity is produced. The falling water, having served its purpose, exits the generating station through the draft tube and the tailrace where it rejoins the main stream of the river.

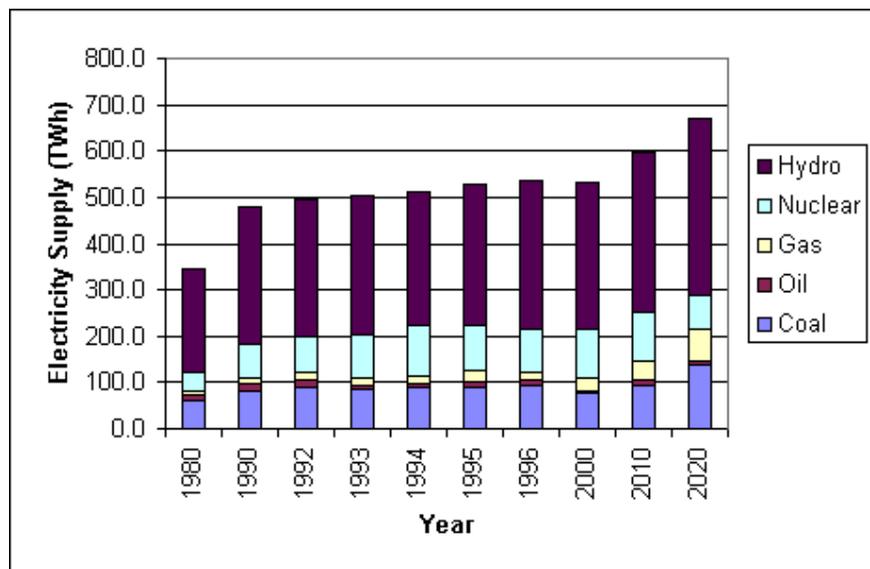
Hydroelectric plants have long been considered a clean and environmentally safe method of producing electricity. Hydro plants do not emit any of the standard atmospheric pollutants such as carbon dioxide or sulphur dioxide that fossil fuel burning

power plants do. Hydro plants also avoid the risk of radioactive contamination that is associated with nuclear power plants.

On the other hand, hydroelectric power has been associated with several environmental problems:

- dams flood vast areas of land previously forested or used in agriculture;
- the river downstream of the dam is deprived of silt which fertilises the river's flood-plain;
- bacteria present in decaying vegetation can change mercury into a water-soluble form that accumulates in fish
- new forms of bacteria grow in many of the hydro rivers.

Canada's production of hydroelectricity began in the late 1880's following the invention of the electric motor. The abundant supply of water made hydroelectricity popular source of power. By 1920, more than 97% of the total electricity produced in Canada came from hydroelectric plants. Today, hydroelectric power is the largest domestic source of electric energy, representing 61% of the nation's supply in 1997.



21. During which year was the increase in hydroelectric power the least?
- a) 1995
 - b) 1998
 - c) 2000
 - d) 1990
22. Why is hydroelectric power considered to be a cleaner source of energy than fossil fuels?
- a) hydro plants emit less atmospheric pollutants
 - b) hydro plants emit no atmospheric pollutants
 - c) hydro plants avoid the risk of radioactive contamination
 - d) hydro plants flood agricultural lands and forests
23. Which of the following best describes the reading passage?
- a) hydroelectricity is an environmental hazard
 - b) How hydroelectricity is produced
 - c) Hydroelectricity in Canada
 - d) Hydroelectricity
24. In the third paragraph what does the word *penstock* mean?
- a) a pipe that carries water to the turbine
 - b) water resting at the higher level
 - c) the driving force of water
 - d) another word for dam
25. Which of the following statements is *not* true?
- a) hydroelectricity is cleaner than burning fossil fuels
 - b) hydroelectricity is safer than nuclear power
 - c) hydroelectricity plants convert kinetic energy to electricity
 - d) 97% of the current total electricity production comes from, hydroelectricity

**Mathematics for Construction & Maintenance/Industrial Electrician Apprentices
Answer Sheet**

Student Name: _____
School: _____
Date: _____

Instructions:

4. Clearly print your name, school and the date in the space provided.
5. Mark your choice for each answer by completely filling in the appropriate space like this with an HB pencil.
6. *Do not write on this test paper. Scrap paper will be provided for rough work.*

Answers for Mathematics Questions

1. a b c d
5. a b c d
6. a b c d
7. a b c d
8. a b c d
9. a b c d
10. a b c d
11. a b c d
12. a b c d
13. a b c d
14. a b c d
15. a b c d
16. a b c d
17. a b c d
18. a b c d
19. a b c d
20. a b c d
21. a b c d

22. a b c d
23. a b c d
24. a b c d
25. a b c d
26. a b c d
27. a b c d
28. a b c d

**LITERACY AND BASIC SKILLS
PROGRAM**

**DIAGNOSTIC ASSESSMENT
MATHEMATICS**

for

construction & MAINTENANCE/ INDUSTRIAL electrician apprentices

June, 2002

MATHEMATICS

**FOR CONSTRUCTION & MAINTENANCE/INDUSTRIAL
ELECTRICIAN APPRENTICES**

This assessment has been developed to evaluate the academic skills that are necessary in the in-school portion of Apprenticeship Training for Construction and Industrial Electricians. The questions in this paper reflect the skills required for lessons, assignments and tests that the apprentices take. The Academic Skills Inventory, which forms the basis for this assessment, was taken from the “Evaluating Academic Readiness for Apprenticeship Training” (EARAT) test published by the Ministry of Training, Colleges and Universities (MTCU). The Literacy and Basic Skills (LBS) Learning Outcomes were used to create a list of specific communication skills that a Construction & Maintenance/Industrial Electrician apprentice needs.

The results of this evaluation are intended for use as a Counselling Tool to allow people to make informed career and preparatory training decisions.

INSTRUCTIONS
<ol style="list-style-type: none">1. Clearly print your name, school and the date on the Answer Sheet.2. Read each passage carefully.3. Based on the information in the passage, choose the best answer for each question.4. Mark your choice on the answer sheet by completely filling in the appropriate space like this <input type="checkbox"/> with an HB pencil. <i>Do not write on this test paper. Scrap paper will be provided for rough work.</i>

*Assessment of Mathematics for
Construction & Maintenance/Industrial Electrician Apprentices*

1. $832 \times 507 =$
 - a) 428,124
 - b) 1,434
 - c) 421,824
 - d) 44,724
2. $124,758 \div 87 =$
 - a) 1,344
 - b) 1,434
 - c) 1,433
 - d) 1,443
3. $[3 + 2(4 \times 2 + 6) - 8] + 10 =$
 - a) 29
 - b) 52
 - c) 72
 - d) 33
4. $6.2(5.4 + 3.8) =$
 - a) 180.792
 - b) 57.04
 - c) 15.4
 - d) 56.04
5. *What is the total length of cable, when 4 feet, 9 inches is added to 15 feet, 6 inches?*
 - a) 30 feet, 2 inches
 - b) 20 feet, 3 inches
 - c) 19 feet, 6 inches
 - d) 19 feet, 9 inches
6. *What is the total length, if 17.661 metres, 6.293 cm and 64 mm are added together?*
 - a) 8.00755 metres
 - b) 806.55 metres
 - c) 30.655 metres
 - d) 6065.5 metres
7. $\frac{2}{6} + \frac{2}{3} - \frac{3}{5} =$
 - a) $\frac{2}{5}$
 - b) $\frac{4}{5}$
 - c) $\frac{5}{12}$
 - d) $\frac{4}{15}$
8. $\frac{2}{9} \div \frac{3}{12} =$
 - a) $\frac{3}{54}$
 - b) $\frac{8}{9}$
 - c) $\frac{1}{18}$
 - d) $\frac{9}{8}$

9. $5\frac{2}{3} \leftrightarrow \frac{1}{4} =$

a) $5\frac{2}{12}$

b) $1\frac{5}{12}$

c) $22\frac{2}{3}$

d) $5\frac{1}{6}$

10. Which of the following correctly expresses the number 17?

a) $3^2 + 2^3$

b) $3^3 + 2^2$

c) $3^2 + 2^2$

d) $3^3 + 2^2$

11. Which of the following is equivalent to 10^5 ?

a) 10,000

b) 100,000

c) 1,000

d) 0.001

12. Which of the following is equivalent to 10^{-3} ?

a) 0.001

b) 0.01

c) 10.0

d) 100.0

13. Which of the following is equivalent to $36,741 \times 10^{-3}$?

a) 367.41

b) 36.741

c) 6,674.1

d) 36,741

14. What is the product of $10^5 \times 10^3$?

a) 10^{15}

b) 10^{-2}

c) 10^2

d) 10^8

15. GST is applied to all services performed by an electrician. If GST is 8%, how much tax would be payable on an invoice charging \$357.00 for services?

a) \$27.59

b) \$26.84

c) \$28.56

d) \$18.74

16. An electrician gives a senior citizen discount of \$198.00 on a job that cost \$792.00. What percentage is the senior's discount?

a) 15%

b) 35%

c) 5%

d) 25%

17. An electrical supply business has 7,862 wall receptacles in stock. If 264 of them are lost through theft, approximately what percentage of receptacles has been stolen?

a) 5%

b) 7%

c) 3%

d) 2%

The drawing in Figure 1 shows a light switch and receptacle installed on a wall that has wainscoting, baseboard moulding and a chair rail. Each panel of wainscoting measures 3 inches by 36 inches. The baseboard moulding is 2 inches high and the chair rail is 1 inches high. The light switch and receptacle measure 2 inches by 4 inches each. Questions 18 – 20 refer to Figure 1.

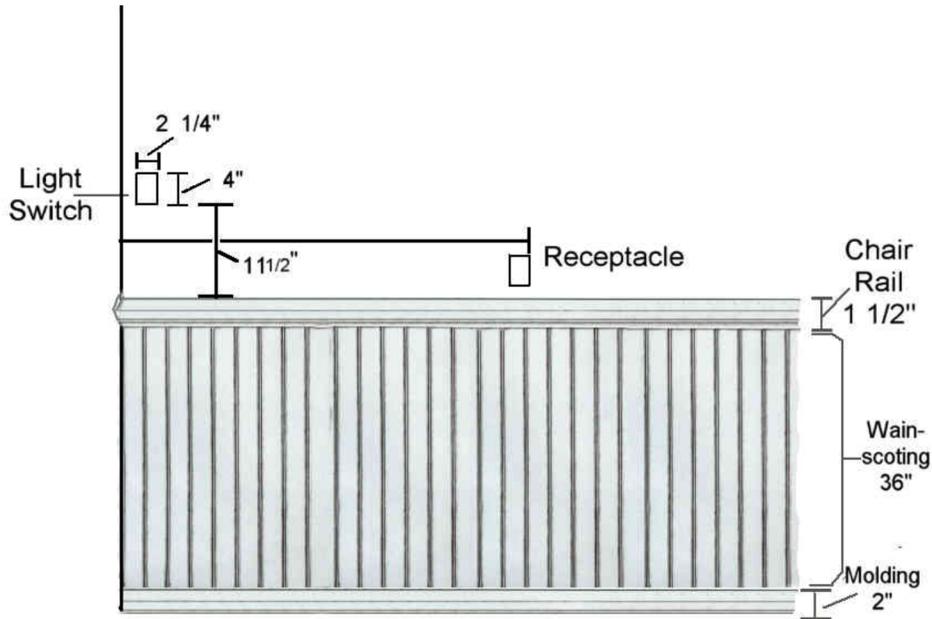


Figure 1: Residential wall with wainscoting and chair rail

18. If wainscoting panels are 3 inches wide, and there are 48 panels of wainscoting on the wall, how long is the wall?
- 10 feet
 - 15 feet
 - 12 feet
 - 11 feet
19. In Figure 1, what is the height of the wall from the floor to the bottom of the light switch?
- 51 inches
 - 48 inches
 - 49 inches
 - 51 inches
20. You have been asked to install a receptacle on a wall similar to the one in Figure 1. The receptacle is to be installed above the chair rail, so that the right side of the receptacle is 7' 3" from the left side of the wall. If the wainscoting panels are 3 inches wide, how many panels would be to the left of the receptacle?
- 87 panels
 - 29 panels
 - 39 panels
 - 78 panels

21. Which of the following is equivalent to 0.625?
- a) 65%
- b) $\frac{5}{8}$
- c) $\frac{5}{16}$
- e) 0.6%
22. A spool of 14-gauge wire is sold in 150 metre spools at \$48.90 per spool. How much would 65 metres of wire cost?
- a) \$21.91
- b) \$29.11
- c) \$21.19
- d) \$11.29
23. What is the ratio of one motor running at 1,750 rpm to a second motor running at 3,500 rpm?
- a) 1 : 2
- b) 1 : 3
- c) 17 : 35
- d) 1 : 5

The following table of Equivalencies may help you to answer Questions #23-26

MEASUREMENT EQUIVALENCIES	
IMPERIAL IMPERIAL TO METRIC	IMPERIAL TO METRIC
1 ft = 12 in	1 in = 2.54 cm
1 yd = 3 ft	1 ft = 30.5 cm
1 mi = 1760 yd	1 yd = 91.44 cm
1 lb = 16 oz	1 mi = 1.6 km
1 pt = 20 fl oz	1 lb = 454 g
1 qt = 2 pt	1 qt (Can) = 1.14 L
1 gal = 4 qt	1 qt (U.S.) = 0.946 L
1 gal (Can) = 1.2 gal (U.S.)	1 fl oz = 28.4 mL
1 fl oz (Can) = 0.83 fl oz (U.S.)	

24. A generator fuel tank holds 5 gal (Can) of gasoline. Approximately how many litres does this tank hold?
- a) 2.5 litres
- b) 23 litres
- c) 2 litres
- d) 2.3 litres
25. You must drive 30 miles to reach a job site. How many kilometres is the round trip?
- a) 36.0 km
- b) 48 km
- c) 100 km
- d) 96 km
26. A length of conduit has an interior diameter of 62.7 mm. What is the approximate interior diameter of the conduit?
- a) 25 inches
- b) 2.5 inches
- c) 16 inches
- d) 1.6 inches
27. A motor weighs 80 pounds. How many kilograms does the motor weigh?
- a) 365.2 kg
- b) 36.52 kg
- c) 3.652 kg
- d) 9.3652 kg

28. Which of the following is equivalent to 0.3125?

- a) $\frac{5}{16}$
- b) $\frac{5}{8}$
- c) $\frac{31}{100}$
- e) 31%

29. Which of the following has the largest value?

- a) $\frac{9}{100}$
- b) $\frac{95}{100}$
- c) 0.009
- d) 0.9

30. The ceiling of a rectangular room measures 12 feet by 20 feet. If ceiling tile costs \$3.99 per square foot, what will it cost to tile the ceiling?

- a) \$967.50
- b) \$560.60
- c) \$960.00
- d) \$957.60

31. A rectangular room requires 17.5 square metres of ceiling tile. The room is 5 metres long. What is the width of the room?

- a) 5 m
- b) 3.5 m
- c) 7 m
- d) 5.5 m

32. Which of the following is equivalent to $a(c + b)$?

- a) $ac + b$
- b) $ab + c$
- c) $ab + cb$
- d) $ac + ab$

Questions 33 – 34 refer to the drawing in Figure 2.

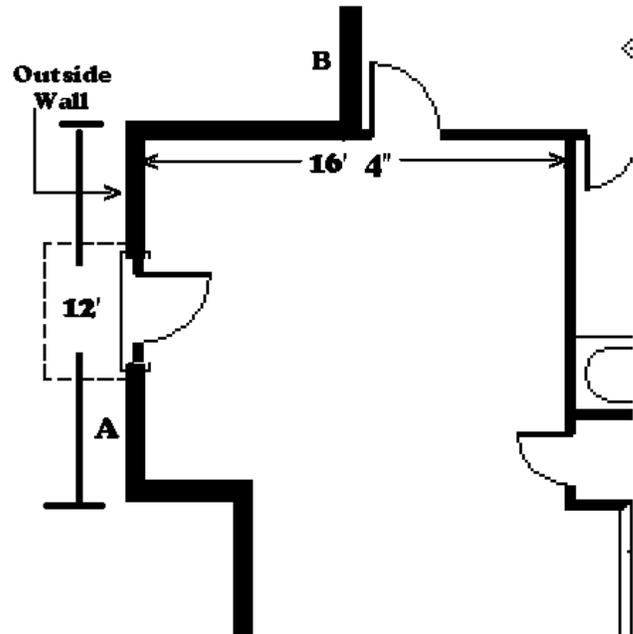


Figure 2: Basement room

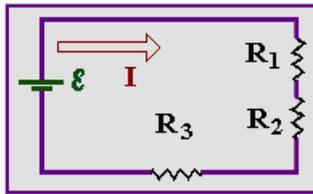
33. What is the approximate distance from wall B to the wall A?

- a) 9 feet
- b) 8 feet
- c) 10 feet
- d) 12 feet

34. What is the distance from the centre of the room to wall A?

- a) 10 feet, 3 inches
- b) 8 feet, 4 inches
- c) 9 feet, 2 inches

- d) 8 feet, 2 inches
35. A resistor is an electrical component that limits or regulates the flow of electrical current in an electronic circuit. Below is a diagram of a series of resistors (R_1 , R_2 , and R_3) on a circuit. R represents the total value of all the resistors on a circuit.



If $R = R_1 + R_2 + R_3$, which of the following formulae is used to calculate the value of R_3 ?

- a) $R_3 = R - R_1 - R_2$
- b) $R_3 = \frac{R_1 + R_2}{R}$
- c) $R_3 = R + R_1 - R_2$
- d) $R_3 = R + R_1 + R_2$
36. 3 pot lights are to be installed in a ceiling so that their centres are an equal distance apart. If the ceiling measures 22 feet, 3 inches, how far apart are the centres of the pot lights?
- a) 8 feet, 5 inches
- b) 11 feet, 1 inch
- c) 7 feet, 5 inches
- d) 7 feet, 3 inches
37. Computer diskettes store computer data. This data can be measured in bytes, kilobytes (KB) or megabytes (MB). The chart below shows the relationship between bytes, kilobytes and megabytes.

1 KB = 1,000 bytes
1 MB = 1,000,000
1 MB = 1,000 KB

A computer diskette holds 1.44 MB. What is the equivalent in KB?

- a) 14,400 KB
- b) 140 KB
- c) 1,400 KB
- d) 14 KB
38. In the equation $4(c - b) = c + d$, $a = 3$, $b = -8$ and $c = 12$. What is the value of d ?

- a) 13
- b) 40
- c) 77
- d) 41

Questions 39 – 40 refer to the right angle triangle shown in Figure 3

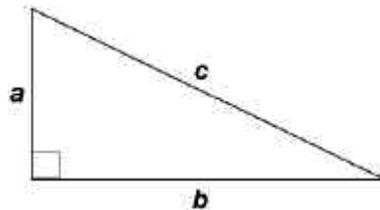


Figure 3: Right angle triangle

39. In the triangle shown, if the length of side a is 8 feet, and the length of side b is 6 feet, what is the length of side c ?
- a) $\sqrt{12}$ feet
- b) 12 feet
- c) $\sqrt{10}$ feet
- d) 10 feet

40. In Figure 3, if the length of side c is 5 metres and the length of side b is 4 metres, what is the length of side a ?
- 3 metres
 - $\sqrt{5}$ metres
 - 25 metres
 - 5 metres

Figure 4 shows a grouping of decorative patio stones. Questions 41 – 44 refer to Figure 4.

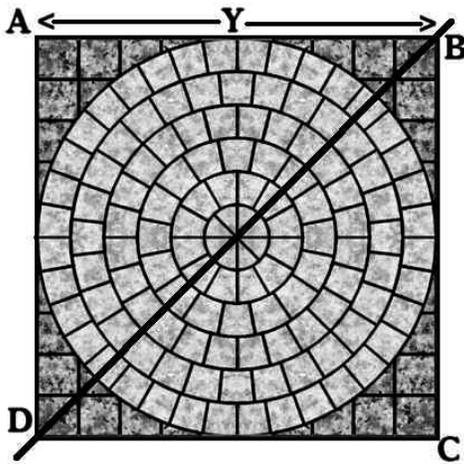


Figure 4: Decorative patio stones

41. If the area of the square shown in Figure 4 is 49 ft^2 , what is the length of line Y ?
- 24.01 ft
 - $\sqrt{2401}$ ft
 - $\sqrt{7}$ ft
 - 7 ft

42. In triangle BDC shown in Figure 4, what is the total measurement of the 3 interior angles?

- 360°
- 90°
- 180°
- 45°

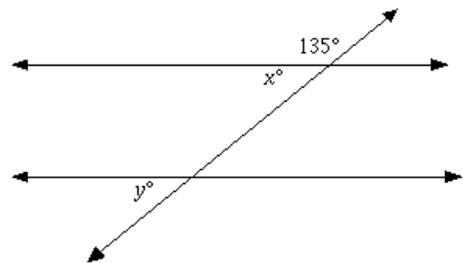
43. In Figure 4, if the length of line Y is 8 metres, what is the area of the circle? ($\pi = 3.14$)

- 502.4 m^2
- 50.24 m^2
- 5.024 m^2
- 12.56 m^2

44. In Figure 4, if line BD has a length of $\sqrt{288}$ ft, what is the length of line Y ?

- 54 ft
- 18 ft
- 27 ft
- 12 ft

45. In the diagram below, if $\angle x$ equals $\angle y$, what is the value of $\angle y$?



- 90°
- 45°
- 115°
- 55

**Mathematics for Construction & Maintenance/Industrial Electrician Apprentices
Answer Sheet**

Student Name: _____
School: _____
Date: _____

Instructions:

7. Clearly print your name, school and the date in the space provided.
8. Mark your choice for each answer by completely filling in the appropriate space like this with an HB pencil.
9. *Do not write on this test paper. Scrap paper will be provided for rough work.*

Answers for Mathematics Questions

1. a b c d
2. a b c d
3. a b c d
4. a b c d
5. a b c d
6. a b c d
7. a b c d
8. a b c d
9. a b c d
10. a b c d
11. a b c d
12. a b c d
13. a b c d
14. a b c d
15. a b c d
16. a b c d
17. a b c d
18. a b c d

19. a b c d
20. a b c d
21. a b c d
22. a b c d
23. a b c d
24. a b c d
25. a b c d
26. a b c d
27. a b c d
28. a b c d
29. a b c d
30. a b c d
31. a b c d
32. a b c d
33. a b c d
34. a b c d
35. a b c d
36. a b c d

37. a b c d
38. a b c d
39. a b c d
40. a b c d
41. a b c d
42. a b c d
43. a b c d
44. a b c d
45. a b c d

Hairstyling Apprenticeship Candidates

Demonstration: LBS Level 1 Making an Appointment

Name: _____

School: _____

Date Completed: _____

Learner Name: _____ Date Completed: _____

Demonstration Title: Making an Appointment

LBS Level: 1

Description: In this demonstration, the learner will gather information about a client, book an appointment for him or her and provide information to the client.
Main Goal Path: Further education and training
Short-term Goal: The goal is to increase reading and numeracy skills to follow instructions at level 1 to prepare for entry to an apprenticeship program as a hairstylist.
Primary Outcome: Read with understanding for various purposes
Secondary Outcomes: Write clearly to express ideas Perform basic operations with numbers Use measurement for various purposes
Materials Required: <ul style="list-style-type: none">• Pencil, eraser• Charts with procedure times and costs
Practitioner Name:
How is this demonstration linked to the learner's goals?
Demonstration Results:
Activity Successfully Completed? <input type="checkbox"/> Yes <input type="checkbox"/> No
Level Successfully Completed? <input type="checkbox"/> Yes <input type="checkbox"/> No

Practitioners Instructions:

1. Make sure the learner understands the information and instructions for this demonstration
2. Go over the evaluation section with your learner to ensure that the learner understands what skills, knowledge or behaviours are being assessed by this demonstration and how they will be evaluated.
3. Discuss with the learner and decide on a reasonable length of time for the completion of this demonstration activity. Record this information on the assessment form.
4. When the learner has completed the demonstration, provide a way for the learner to self-reflect on the experience. Complete the assessment form with the learner, and note whether it was successful or needs to be tried again.

Prior Learning Required:

The learner needs to be familiar reading and filling in calendars, speaking with and listening to another individual, reading money amounts and time notation. This demonstration also requires some ability to make decisions.

Help Allowed:

- clarification of instructions
- assistance with decoding unfamiliar words in the instructions

Possible Adaptation:

None

Demonstration Title: Making an Appointment**LBS Level: 1**

Skills Embedded in the Task		
Learning Outcomes	Skill Sets	Success Markers
Read with understanding for various purposes	Read to find information and for research	<ul style="list-style-type: none"> identifies various conventions of formal texts and uses them to locate and interpret information (simple charts)
Write clearly to express ideas	Write for various purposes	<ul style="list-style-type: none"> completes forms that require only personal identifying information (transition from level 1 to 2)
	Visual presentation	<ul style="list-style-type: none"> prints legibly (capital and small letters)
	Spelling	<ul style="list-style-type: none"> uses phonics to spell unfamiliar words
Speak and listen effectively	Communicating interpersonally	<ul style="list-style-type: none"> uses appropriate greetings and conclusions provides simple information to another individual through speech obtains simple information from one other person through speech (transition from level 1 to 2)
Perform basic operations with numbers	Write numbers	<ul style="list-style-type: none"> read and write numerals from 0 to 100
Use measurement for various purposes	Measurement of time	<ul style="list-style-type: none"> reads digital and analogue clocks and tells and writes time to the quarter-hour (transition from level 1 to 2)

Demonstration Title: Making an Appointment**LBS Level: 1**

Assessment Tool; Marking Scheme		
Learning Outcome	Criteria	# of Marks
Read with understanding for various purposes	Determines how long a hairstyling procedure will take	/2
	Determines how much the procedure will cost	/2
	Determine whether cost includes tax	/1
	Locate a specific hairstylist's schedule	/2
	Find a time slot that will meet the client's needs	/2
Write clearly to express ideas	Prints the client's name and telephone number legibly in the appropriate space	/5
	Completes the cover sheet correctly	/5
Speak and listen effectively	Uses appropriate greeting	/1
	Asks the client which hairstylist s/he would like to use	/2
	Asks what time of day the client wants the appointment	/2
	Give the client the correct amount of time for the procedure	/2
	Give the client the correct cost of the procedure	/2
	Asks the client for name and telephone number	/2
	Uses an appropriate conclusion	/1
Total Marks		/31

The level of performance required for success in this demonstration is

The agreed upon amount of time for the learner to complete this task is

Demonstration Title: Making an Appointment
Instructions and Script for Demonstration

LBS Level: 1

Instructions for the Learner:

1. For this activity, you will be able to use
 - a. an appointment book
 - b. a price list and procedure chart (tells you how long the procedures will take)
 - c. a glossary of terms if you need it
2. Today you're going to use the skills you've been working on in a real life situation. You will pretend to be the receptionist at a hair salon, and I will be a customer who drops in to make an appointment.
3. During the conversation, you will be expected to
 - a. decide on my hair length: is it short, medium or long?
 - b. figure out whether or not my regular stylist will have time to give me a perm
 - c. tell me how long the perm will take and how much it will cost. You can refer to price list and procedure charts.
 - d. book the appointment for me. To do this, you will print my name, telephone number and the procedure I'm having done in the right spot on the calendar.

Do you have any questions before we begin?

Instructor: Good morning (*afternoon*), (learner's name).

Learner: (An appropriate greeting and instructor's name). *Learner asks how s/he can be of service.*

Instructor: I'd like to book an appointment to get a perm this coming Friday. I think that's June 7th.

Learner: *The learner should ask with whom the instructor would like to make an appointment.*

Instructor: I'd rather have Anna do the perm. She's so good at it.

Learner: *The learner should ask the instructor for the preferred time of day.*

Instructor: I'm a little pressed for time in the morning. How long will it take?

Learner: *The learner should refer to the "Procedure Times" chart, and consider the instructor's hair length. The learner gives the instructor the appropriate length of time for the procedure, according to the chart..*

Instructor: I see. Well, I guess that means the morning is out. When does Anna have enough time for me?

Learner: *Learner should suggest a time, or ask the instructor what time would be best between 2:00 p.m. and 6 p.m.*

Instructor: How about 3 o'clock then. That will give me enough time to get here.

Learner: *The learner should ask for the instructor's name and telephone number.*

Instructor: My name is Beth Page.

Learner: *The learner should record the instructor's name and ask for the correct spelling, if unsure. The learner asks for the instructor's phone number.*

Instructor: (gives the school/program phone number)

Learner: *The learner should record the telephone number correctly, and include the procedure and confirm the time of the appointment.*

Instructor: That's fine. Can you tell me how much the perm will cost?

Learner: *The learner should refer to the "Price List" chart, and give the instructor the correct price for the procedure for the correct hair length.*

Instructor: OK. Does that include tax?

Learner: *The learner should check the "Price List" chart and indicate that the price includes tax.*

Instructor: That's fine, then. I'll see you on Friday.

Learner: *The learner should thank the instructor, or conclude the conversation in an appropriate way.*

Demonstration Title: Making an Appointment Level: 1
Learner Instructions

What to do

You work at a hairstyling salon. A customer wants to make an appointment for a perm. You will make the appointment for the customer. You will need to

- Decide how long the customer's hair is
- Figure out when the customer's stylist has time to do the perm
- Tell the customer how long the perm will take and how much it will cost. You can look at a chart to find out.
- Book the appointment by writing the customer's name and phone number in the appointment book. You will also need to write down what the customer wants done.

Ask your teacher if you have any questions before you start.

Hairstyling Demonstration Level 1: Making an Appointment

Price List (does not include tax)

PROCEDURE	SHORT HAIR	MEDIUM HAIR	LONG HAIR
Women's Cut & Style	\$35.00	\$35.00	\$42.00
Men's Cut & Style	\$20.00	\$20.00	\$20.00
Children's Cut & Style	\$20.00	\$20.00	\$30.00
Highlights (cap)	\$65.00	\$65.00	\$85.00
Colour (touch-up)	\$65.00	\$65.00	\$85.00
Perms (root perm)	\$70.00	\$70.00	\$90.00

Procedure Times

PROCEDURE	SHORT HAIR	MEDIUM HAIR	LONG HAIR
Women's Cut & Style	45 minutes	45 minutes	1 hour
Men's Cut & Style	30 minutes	30 minutes	30 minutes
Children's Cut & Style	30 minutes	30 minutes	30 minutes
Highlights (cap)	3 hours	3 hours	3 hours
Colour (touch-up)	2 _ hours	2 _ hours	3 _ hours
Perms (root perm)	3 hours	3 hours	4 hours

Date: Thursday June 6

Time	Sue	Anna	Steve
8:30 – 8:45	/	/	
8:45 – 9:00			
9:00 – 9:15			
9:15 – 9:30			
9:30 – 9:45			
9:45 – 10:00			
10:00 – 10:15			
10:15 – 10:30			
10:30 – 10:45			
10:45 – 11:00			
11:00 – 11:15	Susan Ash 747-1089 Cut	Nancy Crew 621-7830 perm	Miranda Mold 885-2827 cut
11:30 – 11:45	Mel Parsons 740-7886 Highlights		
11:45 – 12:00	Leslie Robins 883-1853 cut	Melissa Harry 749-2224 perm	
12:00 – 12:15	Liz Lorentz 743-8383 cut		
12:15 – 12:30			
12:30 – 12:45			
12:45 – 1:00			
1:00 – 1:15			
1:15 – 1:30			
1:30 – 1:45			
1:45 – 2:00			
2:00 – 2:15	Anne Bonner 579-8235 cut		
2:15 – 2:30			
2:30 – 2:45			
2:45 – 3:00	Lindsay McKnight 579- 3983 cut		
3:00 – 3:15			Tom Landry 895-9024 cut
3:15 – 3:30			
3:30 – 3:45			
3:45 – 4:00			
4:00 – 4:15			
4:15 – 4:30	Tara Landry 883-3911 cut		
4:30 – 4:45			
4:45 – 5:00	/		
5:00 – 5:15			
5:15 – 5:30			
5:30 – 5:45			
5:45 – 6:00			
6:00 – 6:15			
6:15 – 6:30			
6:30 – 6:45			
6:45 – 7:00			

Date: **Friday June 7**

Time	Sue	Anna	Steve
8:30 – 8:45	/	Maria Muldar 893-0909 cut	/
8:45 – 9:00			
9:00 – 9:15		Amira Abdullah 747-2212 cut	
9:15 – 9:30			
9:30 – 9:45			
9:45 – 10:00		Benita Gonzales 885-9330 cut	
10:00 – 10:15			
10:15 – 10:30			
10:30 – 10:45			
10:45 – 11:00			
11:00 – 11:15	Mary Green 745-0893 cut	Carly Simmons 747-0939 perm	
11:30 – 11:45			
11:45 – 12:00			Pam Olson 888-8291 cut
12:00 – 12:15			
12:15 – 12:30		Amanda Redman 743-3004 cut	Grace Coverdale 885-3028 cut
12:30 – 12:45	Joy Fields 885-1283 perm	Emma Bender 884-0049 cut	
12:45 – 1:00		Marlene Sayer 740-3820 colour	Sylvia Munns 740-2911 perm
1:00 – 1:15			
1:15 – 1:30	Mark Brown 650-0083 cut		
1:30 – 1:45			
1:45 – 2:00			
2:00 – 2:15	Anne Richter 578-2845		Shannon Morris 579-2933 highlights
2:15 – 2:30			
2:30 – 2:45	colour		
2:45 – 3:00	Olive Sims 885-2934 cut		Jessica Jones 884-3322 cut
3:00 – 3:15			
3:15 – 3:30			
3:30 – 3:45			
3:45 – 4:00			
4:00 – 4:15			Marta Da Silva 893-1999 colour
4:15 – 4:30	Janet White 579-2394 cut		
4:30 – 4:45			
4:45 – 5:00			Glen Harmon 650-3232 cut
5:00 – 5:15			
5:15 – 5:30			Bonnie Winhold 650-1800 cut
5:30 – 5:45			
5:45 – 6:00			Martha Wiseman 584-9355 perm
6:00 – 6:15			
6:15 – 6:30			
6:45 – 7:00		/	

Date: Saturday June 8

Time	Sue	Anna	Steve
8:30 – 8:45	/	Jasmine Soomal 740-8367 cut	/
8:45 – 9:00			
9:00 – 9:15			
9:15 – 9:30		Sarah Loftus 745-8038 perm	
9:30 – 9:45			
9:45 – 10:00			
10:00 – 10:15			
10:15 – 10:30		Tony Sheehan 747-0237 cut	
10:30 – 10:45			
10:45 – 11:00			
11:00 – 11:15	Lehman/Bompa Wedding Party 885-3925 Cut & Style		
11:30 – 11:45			
11:45 – 12:00			
12:00 – 12:15			
12:15 – 12:30	Lehman/Bompa Wedding Party 885-3925 Cut & Style		
12:30 – 12:45			
12:45 – 1:00			
1:00 – 1:15			
1:15 – 1:30			
1:30 – 1:45	Ted Kendall 650-1283		
1:45 – 2:00	cut		
2:00 – 2:15			
2:15 – 2:30			
2:30 – 2:45			
2:45 – 3:00			
3:00 – 3:15			
3:15 – 3:30			
3:30 – 3:45			
3:45 – 4:00			
4:00 – 4:15			Larry Main 895-1947 cut
4:15 – 4:30	Jane Dunn 623-2190	/	Julia Kraus 578-2288 cut
4:30 – 4:45	cut		
4:45 – 5:00	Amber Dunn 623-2190		
5:00 – 5:15	cut		
5:15 – 5:30			
5:30 – 5:45			
5:45 – 6:00			
6:00 – 6:15			
6:15 – 6:30			
6:45 – 7:00			

Hairstyling Apprenticeship Candidates

Demonstration: LBS Level 2 Completing a Gift Certificate

Name: _____

School: _____

Date Completed: _____

Learner Name: _____ Date Completed: _____

Demonstration Title: **Completing a Gift Certificate**

LBS Level: **2**

Description: In this demonstration, the learner will calculate the cost of a list of services, including tax, and complete a gift certificate to cover the total cost.
Main Goal Path: Further education and training
Short-term Goal: The goal is to increase reading and numeracy skills at level 2 to prepare for entry to an apprenticeship program as a hairstylist.
Primary Outcome: Read with understanding for various purposes
Secondary Outcomes: Write clearly to express ideas Perform basic operations with numbers
Materials Required: <ul style="list-style-type: none">• Pen, pencil, eraser
Practitioner Name:
How is this demonstration linked to the learner's goals?
Demonstration Results: Activity Successfully Completed? <input type="checkbox"/> Yes <input type="checkbox"/> No Level Successfully Completed? <input type="checkbox"/> Yes <input type="checkbox"/> No

Practitioners Instructions:

1. Make sure the learner understands the information and instructions for this demonstration
2. Go over the evaluation section with your learner to ensure that the learner understands what skills, knowledge or behaviours are being assessed by this demonstration and how they will be evaluated.
3. Discuss with the learner and decide on a reasonable length of time for the completion of this demonstration activity. Record this information on the assessment form.
4. When the learner has completed the demonstration, provide a way for the learner to self-reflect on the experience. Complete the assessment form with the learner, and note whether it was successful or needs to be tried again.

Prior Learning Required:

The learner needs to be comfortable reading short, informational texts and simple instructions. The learner should have some experience reading and filling in charts and simple forms and reading/writing money amounts and time notation.

Help Allowed:

- clarification of instructions

Possible Adaptation:

This demonstration could be completed in three separate sessions, if time or concentration are issues.

Skills Embedded in the Task		
Learning Outcomes	Skill Sets	Success Markers
Read with understanding for various purposes	Read and Comprehend	<ul style="list-style-type: none"> reads a short text made up of a minimum of 2-3 paragraphs and may include illustrations, and many words can be understood in context follows written instructions up to 6 steps, and instructions contain only one step per sentence (transition from level 1 to 2)
	Read to find information and for research	<ul style="list-style-type: none"> identifies various conventions of formal texts and uses them to locate and interpret information (simple charts)
Write clearly to express ideas	Write for various purposes	<ul style="list-style-type: none"> completes forms that require non-personal information (e.g. simple order forms) (transition from level 2 to 3)
Perform basic operations with numbers	Add and subtract	<ul style="list-style-type: none"> adds and subtracts money amounts and represents the answer in decimal notation
	Perform basic money calculations	<ul style="list-style-type: none"> reads and writes money amounts using two forms of notation (89¢ and \$0.89)

**Demonstration Title: Completing a Gift Certificate
Answer Sheet**

LBS Level: 2

Part 1: How much will it cost?

Service	Cost
Cut, Wash and Style	\$35.00
Manicure	\$20.00
Pedicure	\$15.00
Facial	\$30.00
Total cost of services	\$100.00

Part 2: How much tax will she pay?

Item	Amount
Total cost of services (from page 1)	\$100.00
GST	\$7.00
PST	\$8.00
Total cost of gift certificate	115.00

1. Part 3: Filling in the Gift Certificate

Gift Certificate	
A Gift For <u>Shelly Short</u>	
Worth <u>One Hundred Fifteen</u> Dollars	
From <u>Ruby Kees</u>	
Authorised By <u>(learners signature)</u> Expires <u>(one)</u> <u>month</u> <u>today's date)</u>	

Demonstration Title: Completing a Gift Certificate**LBS Level: 2****Assessment Tool: Marking Scheme**

Criteria	# of Marks	Comments
Part 1: How much will it cost? <ul style="list-style-type: none">Records correct price for all four servicesCalculates the correct total for all the services	/4 /1	
Part 1 Total	/5	
Part 2: How much tax will she pay? <ul style="list-style-type: none">Locates the correct price range on the sales tax chartRecords the GST accuratelyRecords the PST accuratelyCalculates and records the correct total for the services plus taxes.	/1 /1 /2	
Part 2 Total	/5	
Part 3: Filling in the Gift Certificate <ul style="list-style-type: none">Prints the form legiblyUses cursive writing for signaturePrints recipient's name correctlyPrints money amount correctly in wordsPrints money amount correctly in money notationPrints customer's name correctlyPrints correct expiry date	/1 /1 /2 /2 /1 /2	
Part 3 Total	/10	
Total Marks	/20	

The level of performance required for success in this demonstration is**The agreed upon amount of time for the learner to complete this task is**

Demonstration Title: Completing a Gift Certificate
Learner Instructions

LBS Level: 2

What to do

1. Read all the information provided.
2. Follow all the directions for each part.
3. Fill out the charts and the gift certificate.
4. If you are unsure about some words, you can ask your teacher for help.

Ask your teacher if you have any questions before you start.

Part 1: How much will it cost?

You are a hairstylist working at the Diva Salon. Ruby Kees is one of your clients. She would like to buy a gift certificate for her secretary, Shelly Short.

Shelly’s son is getting married next month. Mrs. Kees wants to pay for a full “makeover” for Shelly on the wedding day.

Before you write out the gift certificate, you have to figure out how much it will cost. Here are the costs for some of the salon’s services.

Service	Price
Cut, Wash and Style	\$35.00
Perm	\$70.00
Highlights	\$65.00
Colour	\$65.00
Manicure	\$20.00
Pedicure	\$15.00
Ear Piercing	\$20.00
Facial	\$30.00
Eyebrow Waxing	\$15.00

Mrs. Kees would like to pay for these services for Shelly.

- 1. Fill in the price for each service.**
- 2. Add up the total.**

Service	Cost
Cut, Wash and Style	
Manicure	
Pedicure	
Facial	
Total cost of services	

Part 2: How much tax will she pay?

Now you must figure out the tax. This chart lists the GST and PST for different price ranges.

Price	GST	PST
\$70.00	\$4.90	\$5.60
\$75.00	\$5.25	\$6.00
\$80.00	\$5.60	\$6.40
\$85.00	\$5.95	\$6.80
\$90.00	\$6.30	\$7.20
\$95.00	\$6.65	\$7.60
\$100.00	\$7.00	\$8.00
\$105.00	\$7.35	\$8.40
\$110.00	\$7.70	\$8.80
\$115.00	\$8.05	\$9.20
\$120.00	\$8.40	\$9.60

1. Find the price range for the total cost of the gift certificate.
2. Add the total cost, GST and PST together.

Item	Amount
Total cost of services (from page 1)	
GST	
PST	
Total cost of gift certificate	

Part 3: Filling in the Gift Certificate

Now it's time to fill in the gift certificate. Mrs. Kees would like the gift certificate to have Shelly Short's name on it. Here are some hints to help you.

2. The gift certificate is for Shelly Short.
3. It is worth as much as it will cost for all the services plus tax.
4. The gift certificate is from Ruby Kees.
5. You are the one who authorises the sale of the gift certificate.
6. The gift certificate expires in 1 year from today.

Gift Certificate			
A Gift For _____			
Worth _____ \$ <table border="1"><tr><td> </td><td> </td></tr></table>			
From _____			
Authorised By _____ Expires _____			
Salon Diva 1483 Westmount Road Kitchener, ON N2H 2Y5 (519) 745-9993			

Hairstyling Apprenticeship Candidates

Demonstration: LBS Level 3 Hairstyle and Face Shape

Name: _____

School: _____

Date Completed: _____

Learner Name: _____ Date Completed: _____

Demonstration Title: **Hairstyle and Face Shape**

LBS Level: **3**

Description: In this demonstration, the learner will read a text about hairstyle and face shape. Using the text, the learner will determine the shape of his/her own face and select an appropriate hairstyle. Finally, the learner will write a paragraph explaining why a hairstyle was selected for a given face shape, and one that requires the learner to apply knowledge to a more general question.
Main Goal Path: Further education and training
Short-term Goal: The goal is to increase reading, writing and measurement skills at level 3 to prepare for entry to an apprenticeship program as a hairstylist.
Primary Outcome: Read with understanding for various purposes
Secondary Outcomes: Write clearly to express ideas Use measurement for various purposes
Materials Required: <ul style="list-style-type: none">• Pen, pencil, eraser• Fabric or vinyl tape measure or ruler• mirror
Practitioner Name:
How is this demonstration linked to the learner's goals?
Demonstration Results: Activity Successfully Completed? <input type="checkbox"/> Yes <input type="checkbox"/> No Level Successfully Completed? <input type="checkbox"/> Yes <input type="checkbox"/> No

Practitioners Instructions:

1. Make sure the learner understands the information and instructions for this demonstration
2. Go over the evaluation section with your learner to ensure that the learner understands what skills, knowledge or behaviours are being assessed by this demonstration and how they will be evaluated.
3. Discuss with the learner and decide on a reasonable length of time for the completion of this demonstration activity. Record this information on the assessment form.
4. When the learner has completed the demonstration, provide a way for the learner to self-reflect on the experience. Complete the assessment form with the learner, and note whether it was successful or needs to be tried again.

Prior Learning Required:

The learner needs to be comfortable reading informational texts simple instructions and charts. The learner should have some experience filling in charts and writing paragraphs. The learner will need to be able to take linear measurements using either imperial or metric units.

Help Allowed:

- clarification of instructions

Possible Adaptation:

The learner could use another person as a model for the activity. For example, the learner might counsel another learner or the instructor about an appropriate hairstyle for his/her face shape.

This demonstration could be completed in three separate sessions, if time or concentration are issues.

Skills Embedded in the Task		
Learning Outcomes	Skill Sets	Success Markers
Read with understanding for various purposes	Read and interpret	<ul style="list-style-type: none"> • makes inferences while reading (transition from level 2 to 3)
	Read to find information and for research	<ul style="list-style-type: none"> • uses conventions of formal text to locate and interpret information (simple charts)
Write clearly to express ideas	Write for various purposes	<ul style="list-style-type: none"> • begins to write for more complex purposes (to present opinion) (transition from level 2 to 3) • organises and develops ideas using paragraphs (transition from level 2 to 3) • provides factual content accurately and completely (level 3)
	Visual presentation	<ul style="list-style-type: none"> • labels and uses pictures and diagrams appropriately • uses cursive (or manuscript) writing legibly
	Vocabulary building in writing, reading and speaking	<ul style="list-style-type: none"> • uses specialised terms in different subject areas, as appropriate to personal goals • routinely introduces new words from reading into writing
Use measurement for various purposes	Linear Measurement	<ul style="list-style-type: none"> • selects the most appropriate unit of measure to measure length • estimates, measures and records linear dimensions of objects

Demonstration Title: Hairstyle and Face Shape
Assessment Tool: Marking Scheme and Rubric

LBS Level: 3

Criteria	# of Marks	Comments
Part 1: Measuring the Face <ul style="list-style-type: none"> • Locates the correct measurement positions • Takes and records accurate measurements 	/4 /4	
Part 1 Total	/8	
Part 2: Finding the Shape <ul style="list-style-type: none"> • Accurately records the correct face shape 	/2	
Part 2 Total	/2	
Part 3: Matching Face Shape to Hair-style <ul style="list-style-type: none"> • Drawing approximates the recommended hairstyle from Part 3 text • Identifies model’s face shape as “square” • Writes an organised and developed paragraph that justifies the choice (see rubric for details) • Suggests that oval-shaped faces are versatile • Writes organised sentences that explains the learner’s answer (see rubric for details) 	/5 /2 /10 /3 /5	
Part 3 Total	/25	
Total Marks	/35	

The level of performance required for success in this demonstration is

The agreed upon amount of time for the learner to complete this task is

**Demonstration Title: Hairstyle and Face Shape
Rubric for Written Responses**

LBS Level: 3

	2	3	4	5
Criteria	Falls well below	Approaches	Meets	Exceeds
Focus, Development and Organisation	<ul style="list-style-type: none"> main idea is unclear or must be inferred <input type="checkbox"/> details are sparse and connections to the main idea must be inferred <input type="checkbox"/> no evidence of overall paragraph structure (beginning, middle or end) <input type="checkbox"/> 	<ul style="list-style-type: none"> main idea is simple or sketchy and mostly undeveloped <input type="checkbox"/> supporting details are simple but insufficient, irrelevant or inappropriate <input type="checkbox"/> structure exists, but the beginning, middle and end are not clear <input type="checkbox"/> 	<ul style="list-style-type: none"> main idea is and sustained and generally developed <input type="checkbox"/> supporting details are relevant and help to clarify the main idea <input type="checkbox"/> overall organisation shows evidence of beginning, middle and end using simple and appropriate transitions <input type="checkbox"/> 	<ul style="list-style-type: none"> main idea is either simple, strongly sustained and well developed <input type="checkbox"/> supporting details are effective, relevant and clarify the main idea <input type="checkbox"/> paragraph contains well-linked beginning, middle and end with appropriate transitional elements <input type="checkbox"/>

	2	3	4	5
Criteria	Falls well below	Approaches	Meets	Exceeds
Writing style	<ul style="list-style-type: none"> no discernible voice or inappropriate voice <input type="checkbox"/> limited range or inappropriate vocabulary <input type="checkbox"/> no sentence variety <input type="checkbox"/> 	<ul style="list-style-type: none"> weak or inconsistent voice but shows some awareness of the need to communicate with audience <input type="checkbox"/> simple but appropriate vocabulary for the purpose <input type="checkbox"/> limited but appropriate use of a few sentence types and structures <input type="checkbox"/> 	<ul style="list-style-type: none"> voice is generally appropriate for the purpose and audience <input type="checkbox"/> vocabulary is generally appropriate for the purpose and audience <input type="checkbox"/> some appropriate use of a variety of sentence types and structures <input type="checkbox"/> 	<ul style="list-style-type: none"> clear, consistent voice that is sustained and appropriate <input type="checkbox"/> appropriate vocabulary for the purpose and audience <input type="checkbox"/> appropriate and effective use of sentence variety <input type="checkbox"/>
Mechanics (grammar, spelling and punctuation)	<ul style="list-style-type: none"> minimal or no use of common conventions of spelling, punctuation or paragraphing <input type="checkbox"/> minimal or no use of basic grammatical structures <input type="checkbox"/> errors interfere with clear communication <input type="checkbox"/> 	<ul style="list-style-type: none"> some evidence of correct use of common conventions of spelling, punctuation and paragraphing <input type="checkbox"/> some evidence of the correct use of subject-verb agreement and phrases to clarify meaning <input type="checkbox"/> errors create some confusion or obscure meaning <input type="checkbox"/> 	<ul style="list-style-type: none"> correct use of common conventions of spelling, punctuation and paragraphing <input type="checkbox"/> correct use of noun-pronoun agreement with phrasing to clarify meaning <input type="checkbox"/> a few errors that do not interfere with meaning <input type="checkbox"/> 	<ul style="list-style-type: none"> consistent use of more complex conventions of spelling, punctuation and paragraphing <input type="checkbox"/> more consistent use of core features of grammar with a variety of sentence types for detail <input type="checkbox"/> practically no errors or error free <input type="checkbox"/>

Demonstration Title: Hairstyle and Face Shape
Learner Instructions

LBS Level: 3

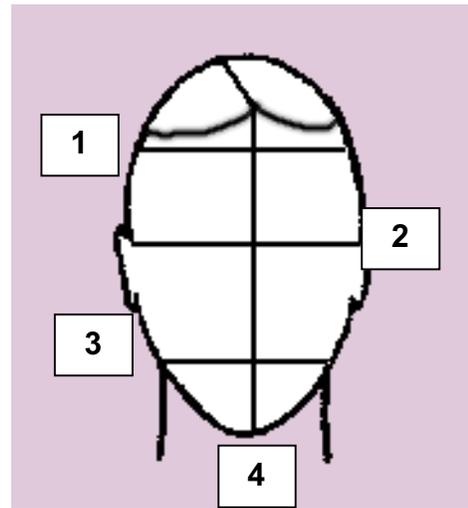
1. This demonstration is written in 3 parts. You may choose to do each part separately, or do the whole demonstration at once.
2. Read the text for each part and follow the directions given.
3. Fill out the charts in Parts 1 and 2.
4. In Part 3, you will be asked to draw a diagram, and write the answers to 2 questions.
5. Make sure you have completed all the parts including the cover page before you hand in the demonstration.
6. If you have any questions, ask your teacher before you begin.

Helping clients choose a hairstyle is a common task for hairstylists. One element that determines the correct hairstyle is the shape of the client's face..

Part 1: Measuring the Face

One way to decide the shape of the face is to measure it. Using your own face as a model, take the following measurements. Use a fabric or vinyl tape measure for best results. You can keep track of your measurements using the chart at the bottom of the page.

1. Measure across your forehead at the widest point. This is usually about halfway between your eyebrows and your hairline
2. Measure your face across the top of your cheekbones.
3. Measure across you jaw line at the widest point.
4. Measure from the tip of your hairline to the bottom of your chin.



Measurement	Distance
Across Forehead	
Across Cheekbones	
Across Jaw Line	
Hairline to Chin	



Now, have your instructor double-check your measurements.

Part 2: Finding the Shape

Once you have determined your measurements, you can decide what shape your face is. The chart below describes the dimensions of various face shapes.

Shape	Name	Dimensions
	Oval Face	The length is equal to about one and a half times the width.
	Round Face	The length and width are about equal. The chin and hairline are rounded.
	Oblong Face	The face is longer than it is wide.
	Heart-shaped Face	Narrow at the jaw line, wide at the cheekbones, and/or at the forehead.
	Square Face	The face is about equal in length and width. The jaw and hairline are square.
	Diamond-shaped Face	The face is widest at the cheekbones. The jaw line and cheekbones are about equal widths, and are narrower than cheekbones.

Complete the following sentence.



My face is a _____ shape.

Part 3: Matching Face Shape to Hairstyle

Now it's time to decide on what kind of hairstyle looks best with each face shape. Here are some general rules.

Oval Face

Someone with an oval-shaped face can wear any kind of hairstyle. The hair can be worn short, medium or long. It looks best when it is worn off the face.

It is best to avoid wearing heavy bangs or styles that are brushed forward on the face.



Oblong Face

Someone with an oblong face look best with short or medium length hairstyles. Soft wispy bangs will hide a high forehead. Layered hairstyles add softness to the straight lines of the face. Side parts are better than centre parts.

It is best to avoid wearing the hair long or with too much height at the crown, because this makes the face look longer. .



Round Face

Someone with a round face should wear either short, swept back hairstyles, or those that are longer than chin length. Layer the top of top and keep the rest fairly close to the face, to give the style fullness and make the face look longer and narrower.

It is best to avoid chin length hair with rounded lines around the face. This makes the face look heavier. Also avoid very short hairstyles that have straight, "chopped" bangs.



Square Face

Someone with a square face should wear the hair short to medium length. To soften the square look of the face, try layers around the face and wispy bangs. Giving the style height at the crown will make the face look longer. Very straight hair should be given a body wave to give the shape some softness.

It is best to avoid long, straight styles that accentuate the square



jaw line, as do straight cuts ending at the jaw line. Also avoid straight bangs and a part in the centre.

Heart-shaped Face

Someone with a heart-shaped face should try chin-length or longer styles with a side part. The hair can be cut in layers around the upper face, and wispy bangs are a good idea.

It is best to avoid short, full styles that accentuate the upper face. Short, full hairstyles with a tapered neckline will make the face appear to be top heavy. Too much height at the crown of the head will give the appearance of a longer and narrower chin.



Diamond-shaped Face

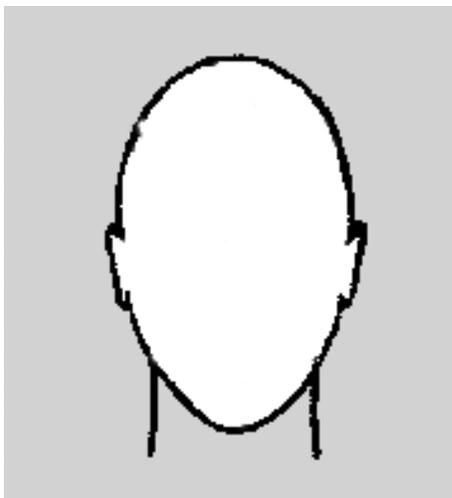
Someone with a diamond-shaped face can wear a variety of hairstyles. Shorter styles should have weight in the nape of the neck, however. This will give the face balance between the strong cheekbones and the more delicate chin line.

It is best to avoid too much hair on the face. This can hide the dramatic features of the diamond-shaped face.



Part 4: Choosing a Hairstyle

Think about the kind of style that would suit your face shape .



Now, draw the hairstyle that best suits the shape of *your* face. This model has an oval face. You might need to adjust the shape to match your own.

Next, identify the shape of this woman's face. Write a paragraph to describe the type of hairstyle that would best suit her face shape. Explain why you would choose this hairstyle.

Face shape: _____



Hair Style:

Many fashion models have an oval shaped face. In a sentence or two, explain why you think this is so.



Finally, check your work over, and hand it in to your instructor.

Hairstyling Apprenticeship Candidates

Demonstration: LBS Level 4 Choosing a Career as a Hairstylist

Name: _____

School: _____

Date Completed: _____

Learner Name: _____ Date Completed: _____

Demonstration Title: **Choosing a Career as a Hairstylist**

LBS Level: **4**

Description: In this demonstration, the learner will research the pros and cons of a career in hairstyling, and plan the steps needed to follow in order to achieve the goal. The learner will write a report about what has been learned.
Main Goal Path: Further education and training
Short-term Goal: The goal is to increase research, reading and writing skills at level 4 to prepare for entry to an apprenticeship program as a hairstylist.
Primary Outcome: Write clearly to express ideas
Secondary Outcomes: Read with understanding for various purposes
Materials Required: <ul style="list-style-type: none">• Promotional materials from schools of hair design (one set provided)• Access to research materials (library, HRDC, etc.)• Internet access (a list of possible sites is included)
Practitioner Name:
How is this demonstration linked to the learner's goals?
Demonstration Results:
Activity Successfully Completed? <input type="checkbox"/> Yes <input type="checkbox"/> No
Level Successfully Completed? <input type="checkbox"/> Yes <input type="checkbox"/> No

Practitioners Instructions:

1. Make sure the learner understands the information and instructions for this demonstration
2. Go over the evaluation section with your learner to ensure that the learner understands what skills, knowledge or behaviours are being assessed by this demonstration, as well as how they will be evaluated.
3. Discuss with the learner and decide a reasonable length of time for the completion of this demonstration activity. Record this information on the assessment form.
4. When the learner has completed the demonstration, provide a way for the learner to self-reflect on the experience. Complete the assessment form with the learner, and note whether it was successful or needs to be tried again.

Prior Learning Required:

The learner needs to be able to independently read textbooks, charts and diagrams and other forms of text. The learner should be able to conduct research in a library and/or on the Internet, plan a research project, brainstorm and organise ideas for writing, write using paragraph form and appropriate levels of language.

Help Allowed:

- The learner can ask for feedback from peers for editing and proof reading
- The learner may ask the instructor for guidance in organisation of research and the report
- The learner may use a dictionary or thesaurus
- The learner may use a word processing application to produce the report

Possible Adaptation:

- The topic, scope and breadth of the research can be varied according to the learner's interests and activities.
- Only sections of the rubric may be used, rather than using it in its entirety. Focus may be applied to those aspects of research or writing upon which the learner has been working.
- Learners may wish to interview a hairstylist or staff at Job Connect, school of hair design or the local community college in addition to text-based research.
- The learner may wish to produce the report using a word processing program. Diagrams, photographs, charts and tables can be added according to the learner's competence with computer technology.
- The learner may wish to make an oral report on this topic. A rubric for oral presentations will be required for this task.

Demonstration Title: Choosing a Career as a Hairstylist
Assessment Tool: Rubric

LBS Level: 4

	2	3	4	5
Criteria	Falls well below	Approaches	Meets	Exceeds
Research skills	<ul style="list-style-type: none"> needs a great deal of assistance to conduct research <input type="checkbox"/> uses only a few or no research skills <input type="checkbox"/> research notes are incomplete and poorly organised <input type="checkbox"/> 	<ul style="list-style-type: none"> needs some assistance to conduct research <input type="checkbox"/> uses some research skills <input type="checkbox"/> research notes are somewhat complete and somewhat organised <input type="checkbox"/> 	<ul style="list-style-type: none"> requires little assistance to conduct research <input type="checkbox"/> uses most of the required research skills <input type="checkbox"/> research notes are mostly complete and show evidence of some organisation <input type="checkbox"/> 	<ul style="list-style-type: none"> conducts research independently <input type="checkbox"/> uses all of the required research skills <input type="checkbox"/> research notes are complete and well-organised <input type="checkbox"/>
Analytic skills	<ul style="list-style-type: none"> learner has omitted some of the research topics <input type="checkbox"/> responses to analytic questions show a lack of understanding of the task <input type="checkbox"/> some of the information is copied from the source <input type="checkbox"/> 	<ul style="list-style-type: none"> learner does not include factual information <input type="checkbox"/> responses to analytic questions show some understanding of the task <input type="checkbox"/> has difficulty using own words <input type="checkbox"/> 	<ul style="list-style-type: none"> includes factual information on all topics <input type="checkbox"/> clearly explains all topics <input type="checkbox"/> responses to analytic questions clarify personal concerns and evaluate the data <input type="checkbox"/> 	<ul style="list-style-type: none"> includes factual information on all topics and provides additional relevant information <input type="checkbox"/> responses to analytic questions are well thought out and show evidence of problem-solving skills <input type="checkbox"/>

	2	3	4	5
Criteria	Falls well below	Approaches	Meets	Exceeds
<p>Organisation of writing (introduction, body, conclusion, and bibliography)</p>	<ul style="list-style-type: none"> uses a weak introduction and conclusion <input type="checkbox"/> paragraphs are not structured <input type="checkbox"/> the main idea is only partially presented with no supporting detail <input type="checkbox"/> report is illogically organised <input type="checkbox"/> shows no evidence of revision <input type="checkbox"/> does not include bibliography <input type="checkbox"/> 	<ul style="list-style-type: none"> shows evidence of an introduction and conclusion <input type="checkbox"/> information is presented in paragraph form with some supporting details <input type="checkbox"/> logic in organisation is weak <input type="checkbox"/> shows some evidence of self-revision <input type="checkbox"/> incomplete bibliography <input type="checkbox"/> 	<ul style="list-style-type: none"> introduction and conclusion are linked clearly and effectively <input type="checkbox"/> uses well-developed paragraphs and supporting details are used for effect <input type="checkbox"/> logical organisation <input type="checkbox"/> shows evidence of peer revision <input type="checkbox"/> complete bibliography <input type="checkbox"/> 	<ul style="list-style-type: none"> creative and logical organisation of report <input type="checkbox"/> report includes diagrams, charts or graphs <input type="checkbox"/> supporting details are chosen for the best effect <input type="checkbox"/> independently revises work and seeks the opinion of others <input type="checkbox"/> no errors in the bibliography <input type="checkbox"/>

	2	3	4	5
Criteria	Falls well below	Approaches	Meets	Exceeds
Writing style (voice, vocabulary and sentence structure)	<ul style="list-style-type: none"> uses inappropriate voice <input type="checkbox"/> only some variety in sentence structure <input type="checkbox"/> uses only some new words and terminology <input type="checkbox"/> report is difficult to read <input type="checkbox"/> 	<ul style="list-style-type: none"> uses an inconsistent voice in writing <input type="checkbox"/> uses simple and compound sentences for detail uses some specialised terminology found in the reading <input type="checkbox"/> report is generally neat and easy to read <input type="checkbox"/> 	<ul style="list-style-type: none"> voice is appropriate for the purpose <input type="checkbox"/> uses a variety of sentence structures for interest and to provide detail <input type="checkbox"/> uses words to create interest for the reader uses specialised terminology correctly and for effect <input type="checkbox"/> report is neat and easy to read <input type="checkbox"/> uses elements such as insertion of graphics in a word processing application <input type="checkbox"/> 	<ul style="list-style-type: none"> uses voice to connect with the reader and reinforce the purpose of writing <input type="checkbox"/> consciously uses sentence structure and types for a particular effect <input type="checkbox"/> uses vocabulary creatively and for effect <input type="checkbox"/> uses a word processing application to insert graphs, tables and charts <input type="checkbox"/>
Mechanics (grammar, spelling and punctuation)	<ul style="list-style-type: none"> several mechanical errors <input type="checkbox"/> errors interfere with meaning <input type="checkbox"/> requires a lot of assistance to make corrections <input type="checkbox"/> 	<ul style="list-style-type: none"> several minor errors <input type="checkbox"/> errors sometimes interfere with meaning <input type="checkbox"/> revises with some assistance <input type="checkbox"/> 	<ul style="list-style-type: none"> a few errors that do not interfere with meaning <input type="checkbox"/> revises with little assistance <input type="checkbox"/> 	<ul style="list-style-type: none"> practically no errors or error free <input type="checkbox"/> works independently to correct errors <input type="checkbox"/>

The level of performance required for success in this demonstration is

The agreed upon amount of time for the learner to complete this task is