Literacy Northwest
Regional Literacy & Basic Skills Network

OALCF Tasks for the Apprenticeship Goal Path: Prepared for the Project, *Developing Best Practices for Increasing, Supporting and Retaining Apprentices in Northern Ontario (2014)*

OALCF Task Cover Sheet

Task Title: Calculating Service Size

Learner Name:
Date Started: **Date Completed:**
Successful Completion: Yes___   No___
Goal Path: Employment ✓ Apprenticeship ✓ Secondary School___   Post Secondary ___ Independence___
Task Description: Electricians calculate the service size for homes and other buildings. They take into consideration the size of the home and the minimum legal service size.

Competency:	Task Group(s):
A: Find and Use Information	A1: Read continuous text
B: Communicate Ideas and Information	A2: Interpret documents
C: Understand and Use Numbers	B2: Write continuous text
D: Use Digital Technology	C3: Use measures

Level Indicators:
A1.1:   Read brief texts to locate specific details
A1.2:   Read texts to locate and connect ideas and information
A2.2:   Interpret simple documents to locate and connect information
B2.1:   Write brief texts to convey simple ideas and factual information
B2.2:   Write texts to explain and describe information and ideas
C3.1:   Measure and make simple comparisons and calculations
C3.2:   Use measures to make one-step calculations
D.1:   Perform simple digital tasks according to a set procedure
Performance Descriptors: see chart on last page
Materials Required: • Pencil   • Calculator

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Electricians calculate the service size for homes. Service size is the amount of electricity (measured in amperes (amps)) that a house requires. The electricity enters the house through a fuse or breaker panel; the panel is rated for the service size calculated (e.g. 60, 100, 120, 150, 200 amps).

Electricians take into consideration the size of the home, the number of plugs, lights and appliances requiring electricity and the minimum legal service size. They also read the Canadian Electrical Code to determine maximum items/load on a circuit.

Service size is based on 2 factors: calculated load and minimum service size.

The calculated load is the sum of all the loads. A load is anything (a resistor) powered by electricity such as plugs, lights, stoves, dryers and furnaces; light switches are not included in the calculation. Minimum lights, switches and plugs are listed in the Canadian Electrical Code and are based on the room type and size as well as the square meters of the house. The basic load for a house (up to 90 m²) is 5,000 watts; other resistors (such as a stove) are added to this to determine the total wattage.

The minimum service size is based on the square meters of the house. It is legal (and sometimes preferred) to have a larger service size than required (so more items requiring electricity can be added later) **but** it is illegal to install a smaller service size than required.

Learner Information and Tasks:

Task 1:   a)   Plugs, light switches and furnaces are considered loads. True ____ False ____

               b)   Service size is measured in amperes. True ____ False ____

               c)   The basic load for a small house is _____ watts.

Task 2:   Amperes (amps) = Watts (Total)/Volts
               a)   Calculate the total amps required for the following service:
                    - Basic load = 5,000 watts
                    - Range (stove) = 6,000 watts
                    - Dryer = 1,000 watts
                    The service is 240 volts.

b) The area of this house is 84 m². Use the Service Size table (partial) below to determine the minimum legal service size for this house. Write your answer in a full sentence below.

Sq. Meters	Minimum Service Size (amps)	Include basement dimensions in calculation
Less than 80	60	No
80 - 90	100	No
90 - 180	120	Yes (75%)

Information for Task 3:

Rule 12–4,000: A maximum of 12 outlets may be connected to a circuit. These may be plugs (excluding special ones in the kitchen or for appliances such as a refrigerator) or lights or any combination. It is better to have a circuit contain both lights and plugs. Light switches do not count as part of the 12. It is encouraged that 10 (or even 8) plugs or lights be on any circuit but 12 is the legal maximum.

Count a single or duplex receptacle (plug) as one outlet.

Rule 2-316 and 30-502: The Electrical Code requires at least one light, controlled by a switch for the dining room, den and living room.

Rule 26-712(a)(c) requires that a receptacle (plug) be no further that 1.8 m from an appliance (e.g. lamp, television).

Task 3: a) A house has a living room, a dining room and a den. The den has 4 receptacles, the living room has 4 and the dining room has 3. Calculate the number of lights, plugs and switches required for the three rooms.

b) Can the 3 rooms be put on one circuit? Explain your answer.

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Answer Key

Task 1:	a)	**False**
	b)	**True**
	c)	**5,000**

Task 2:   a)   Amperes (amps) = Watts (Total)/Volts
Calculate the total watts.
Total watts = 5,000 + 6,000 + 1,000
Total watts = 12,000
Amperes (amps) = Watts (Total)/Volts
Amperes (amps) = 12,000/240
Amperes (amps) = 50

b) 84 m^2 is more than 80 m^2 but less than 90m^2. **The minimum legal service size is 100 amps.**

Task 3:   a)   Add the receptacles of the 3 rooms
4 + 4 + 3 = 11
Each room must have a light and a switch.
The three rooms will have 3 lights and 3 switches.
Add the lights, switches and receptacles.
3 + 3 + 11 = 17

b)   **The maximum number of outlets on a circuit is 12. Light switches do not count.**
17 – 3 (light switches) = 14
The 3 rooms cannot be on the same circuit because there are more than 12 outlets.
Teacher Note: this answer must be based on the answer the learner gave in 3, a)…if that number was different than 17 then base the result on the number they use.

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	Performance Descriptors	Needs Work	Completes task with support from practitioner	Completes task independently
A1.1	• reads short texts to locate a single piece of information			
A1.2	• scans text to locate information			
	• locates multiple pieces of information in simple texts makes low-level inferences			
	• makes connections between sentences and between paragraphs in a single text			
	• reads more complex texts to locate a single piece of information			
	• follows the main events of descriptive, narrative and informational texts			
	• obtains information from detailed reading			
A2.2	• performs limited searches using one or two search criteria			
	• extracts information from tables and forms			
	• uses layout to locate information			
	• makes connections between parts of documents			
	• makes low-level inferences			
B2.1	• writes simple texts to request, remind or inform			

	• conveys simple ideas and factual information			
	• uses sentence structure, upper and lower case and basic punctuation			
B2.2	• performs limited searches using one or two search criteria			
	• extracts information from tables and forms			
	• uses layout to locate information			
	• makes connections between parts of documents			
	• makes low-level inferences			
C3.1	• adds and subtracts whole number measurements			
	• recognizes values in number and word format			
C3.2	• calculates using numbers expressed as whole numbers, fractions, decimals, percentages and integers			
	• understands and uses formulas for finding the perimeter, area and volume of simple, common shapes			
	• chooses and performs required operation(s); may make inferences to identify required operation(s)			
	• selects appropriate steps to solutions			
	• interprets, represents and converts measures using whole numbers, decimals, percentages, ratios and simple, common fractions (e.g. ½, ¼)			
	• uses strategies to check accuracy (e.g. estimating, using a calculator, repeating a calculation, using the reverse operation)			

D.1	• follows simple prompts			
	• follows apparent steps to complete tasks			
	• interprets brief text and icons			
	• locates specific functions and information			

This task: was successfully completed___   needs to be tried again___

Learner Comments

_____   _____
Instructor (print)   **Learner Signature**