



Legend

X The standard is clearly addressed by program activities.

- This standard potentially could be addressed as part the program either by actions that the coach or teacher takes when working with the students or by conditions established by the program.

Modu	ıle Abbreviations		
WS	Starting with Workforce Skills	PS	Project Sprints and Competition
DG	Designing for the Game	14	Industry 4.0 and Your Community
BR	Building and Programming a Basic Robot	SJ	Sensors Machine Learning and Java
MM	Machines to Mechanisms	12	Improving through Iteration II
11	Improving through Iteration I	LC	Learning and Pathways and Career Exploration

TEJ3M	Computer Technology Fundamentals Expectations	WS	DG	BR	MM	I1	PS	14	SJ	12	LC
	A1.1 describe how the internal components of a computer function (e.g., CPU,			Х				Х	Х		
	mainboard, disk drives, RAM, chipset, video card, sound card, expansion slot);										
	A1.2 describe various standards for connecting computer components (e.g.,			х		х		х	х		
e e	parallel port, RS-232, USB, IEEE 1394, VGA, DVI);										
Computer Hardware	A1.3 describe trends in the development of computer hardware (e.g., size, cost,							-			
ard	and speed of processors, memory, and hard drives; video resolution; capacity of										
ÖΪ	optical disks).										
	A2.1 describe the essential functions and other features of various operating	-	-	-	-	-	-	-	-	-	-
	systems (e.g., functions: management of resources, files, processes, and										
	applications; features: services, usability, performance, applications such as text										
	editor, web browser, or media player);										
	A2.2 describe changes that may be required when upgrading hardware			Х							
	components or features of a computer system (e.g., BIOS updates, installation of										
	drivers for new hardware, resolution of compatibility issues);										
E S	A2.3 describe the essential functions performed by the BIOS firmware in			х							
yste	computer systems (e.g., POST [power on self test], boot sequence, hardware										
Computer Systems	recognition, detection of master boot record);										
	A2.4 describe how the BIOS, hardware, and operating system of a computer			-							
	interact.										
Ö											





TEJ3 M	Computer Technology Fundamentals Expectations	WS	DG	BR	MM	I1	PS	14	SJ	12	LC
Electronic, Robotics, and Computer Interfacing	A3.1 identify and describe the functions of electronic components (e.g., resistor,			Х		х			х	х	
	capacitor, diode, LED)										
	A3.2 describe the function of electrical devices used in control systems (e.g.,			Х		х			х	х	
<u> </u>	stepper motor, direct-current motor, touch sensor, accelerometer, optical sensor,										
and	power supply);										
cs, s	A3.3 calculate the values of components in electronic circuits using fundamental			-							
ooti	laws (e.g., Ohm's law, Kirchhoff's laws);										
Rok	A3.4 explain the importance of advances in electronics (e.g., compare size,							-			
nic, ing	cost, and performance of vacuum tubes, transistors, and integrated										
tror	circuits);										
lect	A3.5 compare the advantages and disadvantages of interfacing using			Х		Х		Х	Х	Х	
ш <u>=</u>	desktop computers, microcontrollers, and programmable logic controllers										
	A4.1 explain fundamental network concepts (e.g., bandwidth, throughput,										
	full duplex, half duplex);										
ots	A4.2 explain the fundamental aspects of TCP/IP addressing as it pertains to			-				-			
de	workstations on a network (e.g., workstation IP address, subnet mask,										
Networking Concepts	MAC [media access control] address, default gateway address);										
8	A4.3 describe various services offered by servers to network clients (e.g.,			-				-			
Α̈́	HTTP, FTP, SMTP, telnet, printing, file transfers and storage, login);										
۷o۲	A4.4 describe methods for making a network secure (e.g., firewalls, data			-				-			
et	and password encryption, user authentication, WEP or WPA keys, security										
Z	of server room).										
	A5.1 describe binary and hexadecimal numbers, and convert positive										
no gic	integers among decimal, binary, and hexadecimal number systems;										
atic Lo	A5.2 compare binary and hexadecimal representation of addresses and										
Data Representation and Digital Logic	data (e.g., absolute addressing, character codes, colours);										
ese Dig	A5.3 relate Boolean algebra to the fundamental logic gates and to								х		
Data Repri	combinations of these gates, using symbolic, algebraic, and numeric										
a y	representation										





TEJ3M	B. Computer Technology Skills	WS	DG	BR	MM	I1	PS	14	SJ	12	LC
	B1.1 build a computer from parts to meet specified requirements (e.g., for										
	gaming, business, entertainment, media centre, or graphic design);										
	B1.2 use correct procedures to prevent damage to sensitive components (e.g., use	-	-	-	-	-	-	-	-	-	-
	anti-static wrist straps and mats, disconnect power when inserting expansion										
Hardware Solutions	cards);										
olut	B1.3 install and configure peripheral devices in a computer system (e.g., printer,								Х		
e Sc	video camera, external drives);										
war	B1.4 document maintenance and troubleshooting of computer hardware on a	х		х	х	Х	х	Х	Х	Х	х
lard	day-to-day basis (e.g., use a journal or log to record work done, time taken,										
	problems found, solutions attempted, and results).										
	B2.1 set up and configure a home office system (e.g., computer, scanner, printer,										
sms	appropriate software);										
Computer Systems	B2.2 use system utilities for optimization and backup (e.g., defragment files; scan										
S IS	hard drives for defective sectors; run complete, incremental, and differential										
oute	backups);										
l mc	B2.3 configure a computer system to use multiple operating systems (e.g., dual										
ŭ	boot, virtual machines).										
	B3.1 use a design process (see pp. 22–23) to design and safely construct and test	-	-	-	-	-	-	-	-	-	-
tics,	interfacing or robotics circuits (e.g., for LED traffic lights, VU meter, alarm system,										
Electronic, Robotics, and Computer Interfacing	or motor control), using appropriate materials and techniques, including										
	soldering;										
	B3.2 troubleshoot an electronic circuit using appropriate methods and test			х		х	х		Х	Х	
Electr and C Interf	equipment (e.g., methods: isolation and substitution of components; equipment:										
a E	multimeter, oscilloscope, logic probe);										





	B3.3 draw and interpret diagrams that represent circuit components and								Х	Х	
	functions (e.g., schematic diagram, block diagram, flow chart);										
	B3.4 use computer programs to simulate circuit performance and to draw			Х		х				Χ	
	schematic diagrams and circuit layouts (e.g., circuit simulator, schematic capture										
	software, printed circuit board layout software).										
	B4.1 design, install, and configure a peer-to-peer network (e.g., choose										
र	appropriate computers and network interfaces, construct cables, enable file										
eb	sharing) using appropriate tools, materials, and equipment (e.g., UTP cable, 8P8C										
ouc	connectors, crimping tool, cable tester);										
) S	B4.2 draw diagrams of various LAN types (e.g., peer-to-peer, client-server) and										
king	topologies (e.g., bus, star, ring);										
Networking Concepts	B4.4 use a variety of methods to verify the operation of a network (e.g., visual			Х		х			х	Х	
et. ∣	inspection, ping, ipconfig, telnet, tracert, arp);										
ž	B4.5 use a problem-solving process (see pp. 21–23) to troubleshoot networks.			Х		х			х	Х	
	B5.1 use constants, variables, expressions, and assignment statements correctly,			х		Х			Х	Х	
	taking into account the order in which operations are performed;										
ng	B5.2 use input statements, output statements, selection structures, and repetition			х		Х			Х	Х	
Computer Programming	structures in a program;										
put ran	B5.3 use a design process (see pp. 22–23) to write, test, and debug a computer			Х	Х	Х	х	Х	Х	Х	Х
lgo.	program that controls and/or responds to the inputs from an external device (e.g.,										
S F	LED array, motor, relay, infrared sensor, temperature sensor).										
TEJ3M	C. Technology, The Environment and Society	WS	DG	BR	MM	I1	PS	14	SJ	12	LC
<u>e</u>	C1.1 describe the effects of computer and electronic technology on the							-			
+	environment (e.g., accumulation of electronic waste, including lead and other										
anc	toxic materials used in computers; release of ozonedestroying chemicals used to										
Jy 8	wash soldering flux from circuit boards; energy consumed by computers left in										
<u>0</u>	standby mode; fuel consumption and air pollution reduced by computerized										
סדי ס	traffic-control systems);										
Technology and the Environment	C1.2 outline how community partners and government agencies apply the							-			
ř	reduce/reuse/ recycle concept to computer technology.										
	C2.1 describe the benefits of computer and electronic technology for society (e.g.,							-			
	greater efficiency and lower costs for information services, improved access to										
	technology for economically disadvantaged people and nations, development of a										
	"global village");										





	C2.2 describe some of the drawbacks of computer and electronic technology for society (e.g., loss of privacy, infringement of intellectual property rights through unlicensed copying and electronic distribution, a more sedentary lifestyle, spam, telemarketing, Internet gambling addictions).							-			
TEJ3M	D. Professional Practice and Career Opportunities	WS	DG	BR	ММ	11	PS	14	SJ	12	LC
	D1.1 comply with relevant industry practices, standards, and related legislation to ensure workplace safety (e.g., standards and regulations specified in the Workplace Hazardous Materials Information System [WHMIS] and the Electrical Safety Code; grounding and enclosure standards for electrical circuits; ergonomically sound workplace arrangements and practices);	х	Х	х	х	х	х	х	х	х	х
	D1.2 describe and use appropriate equipment, techniques, and strategies to avoid health and safety problems associated with computer use (e.g., back injuries from improper lifting of heavy equipment, repetitive strain injuries, eye strain).	х	х	Х	X	х	х	х	х	х	х
	D2.1 describe the components of an acceptable use policy for computers (e.g., restrictions on commercial or personal use, prohibition of inappropriate content, protection of privacy);	х	х	х	X	х	х	х	х	x	х
	D2.2 explain the importance of and comply with software licensing legislation (e.g., copyright and patent acts);							-			
	D2.3 explain the importance of security (e.g., password protection, encryption) for confidential data and other sensitive electronic information (e.g., to protect against industrial espionage or identity theft).							-			
	D3.1 describe various careers related to computer technology and electronics that require postsecondary education (e.g., computer engineer, systems analyst, network analyst, information technology technician);										х
	D3.2 describe entry requirements, including computer expertise, for careers related to computer technology (e.g., apprenticeships, university programs, college programs, industry certifications);										х
	D3.3 identify groups and programs that are available to support students who are interested in pursuing non-traditional career choices in computer technology (e.g., mentoring programs, virtual networking/support groups, specialized postsecondary programs, relevant trade/industry associations);										х
	D3.4 demonstrate an understanding of and apply the Essential Skills that are important for success in the computer technology industry, as identified in the	х	х	х	х	Х	х	Х	Х	Х	х





Ontario Skills Passport (OSP) (e.g., reading text, writing, document use, computer										
use, oral communication, numeracy, thinking skills);										
D3.5 demonstrate an understanding of and apply the work habits that are	х	Х	Х	Х	Х	Х	Х	Х	Х	Х
important for success in the computer technology industry, as identified in the										
Ontario Skills Passport (e.g., working safely, teamwork, reliability, organization,										
working independently, initiative, self-advocacy);										
D3.5 demonstrate an understanding of and apply the work habits that are	Х	Х	Х	Х	Х	Х	Х	х	Х	Х
important for success in the computer technology industry, as identified in the										
Ontario Skills Passport (e.g., working safely, teamwork, reliability, organization,										
working independently, initiative, self-advocacy);										