**Area of Learning: Applied Design, Skills, and Technologies — Computer Studies Grade 10**

**BIG IDEAS**

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| User needs and interests drive the design process. |  | Social, ethical, and sustainability issues are influenced by design. |  | Complex tasks require different technologies and tools at different stages. |

**Learning Standards**

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| **Curricular Competencies** | **Content** |
| *Students are expected to be able to do the following:*Applied Design*Understanding context** Engage in a period of **research** and **empathetic** **observation**

*Defining** Identify potential users, societal impacts, and other relevant contextual factors for a chosen design opportunity
* Identify criteria for success, intended impact, and any **constraints** or possible unintended impacts

*Ideating** Screen ideas against criteria and constraints
* Critically analyze and prioritize competing **factors** to meet community needs for preferred futures
* Maintain an open mind about potentially viable ideas

*Prototyping** Identify and use **sources of inspiration** and information
* Choose a form for prototyping and develop a **plan** that includes key stages and resources
* Prototype, making changes to tools, materials, and procedures as needed
* Record **iterations** of prototyping
 | *Students are expected to know the following:** design opportunities
* **computer hardware**, peripherals, internal and external components, and standards
* distinctions between **software types**,cloud-based and desktop applications
* intermediate features of **business applications**, including word processing, spreadsheets, and presentations
* **operating system shortcuts** and **command line operations**
* **preventive maintenance** of hardware and software
* **computer security risks**
* hardware and software **troubleshooting**
* **wired and wireless computer networking**
* **evolution of digital technology** and the impact on traditional models of computing
* **risks and rewards** associated with big data, multi-device connectivity, and the Internet of Things
* principles of **computational thinking**
* introductory computer **programming concepts and constructs**
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**Learning Standards (continued)**

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| **Curricular Competencies** | **Content** |
| *Testing** Identify **sources of feedback**
* Develop an **appropriate test** of the prototype
* Conduct the test, collect and compile data, evaluate data, and decide on changes
* Iterate the prototype or abandon the design idea

*Making** Identify and use appropriate tools, **technologies**, materials, and processes for production
* Make a step-by-step plan for production and carry it out, making changes as needed

*Sharing** Decide on how and with whom to **share** **product** and processes
* Demonstrate the product to potential users, providing a rationale for the selected solution, modifications, and procedures
* Use appropriate terminology
* Critically reflect on their design thinking and processes, and identify new design goals
* Assess their ability to work effectively both as individuals and collaboratively in a group, including ability to share and maintain an efficient collaborative workspace

Applied Skills* Demonstrate an awareness of precautionary and emergency safety procedures in both physical and digital environments
* Identify the skills needed in relation to specific projects, and develop and refine them

Applied Technologies* Choose, adapt, and if necessary learn more about appropriate tools and technologies to use for tasks
* Evaluate **impacts**, including unintended negative consequences, of choices made about technology use
* Evaluate the influences of land, natural resources, and culture on the development and use of tools and technologies
 | * **planning and writing** simple programs, including games
* **impacts of computers and technology on society**
* **ethical considerations** of technology use, including **cultural appropriation** and **environmental sustainability**
* **digital literacy** and digital citizenship
* impacts of technology use on personal **health and wellness**
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|  **APPLIED DESIGN, SKILLS, AND TECHNOLOGIES – Computer StudiesCurricular Competencies – Elaborations Grade 10** |
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| * **research:** seeking knowledge from other people as experts, secondary sources, and collective pools of knowledge in communities and collaborative atmospheres both online and offline
* **empathetic observation:** may include experiences and people, including users, experts, and thought leaders
* **constraints:** limiting factors such as task or user requirements, materials, expense, environmental impact
* **factors:** including social, ethical, and sustainability
* **sources of inspiration:** may include personal experiences; exploration of First Peoples perspectives and knowledge; the natural environment and places, including the land and its natural resources and analogous settings; cultural influences; people, including users, experts, and thought leaders
* **plan:** for example, pictorial drawings, sketches, flow charts
* **iterations:** repetitions of a process with the aim of approaching a desired result
* **sources of feedback:** may include peers; users; First Nations, Métis, or Inuit community experts; other experts and professionals
* **appropriate test:** consider conditions, number of trials
* **technologies:** tools that extend human capabilities
* **share:** may include showing to others or use by others, giving away, or marketing and selling
* **product:** for example, a physical product, a process, a system, a service, or a designed environment
* **impacts:** personal, social, and environmental
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|  **APPLIED DESIGN, SKILLS, AND TECHNOLOGIES – Computer StudiesContent – Elaborations Grade 10** |
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| * **computer hardware:** for example, central processing unit (CPU), random-access memory (RAM), read-only memory (ROM), cache, hard drive, solid-state drive (SSD), motherboard, power supply, video card, sound card, printer, monitor, scanner, keyboard, mouse, speakers, flash memory, universal serial bus (USB) (2, 3, C), megahertz, megabytes, gigabytes
* **software types:** for example,systems software, utility software, application software
* **business applications:** software tools for communicating, presenting, organizing, and formatting data
* **operating system shortcuts:** for example,cut, copy, paste, print, print window, print screen, screen refresh
* **command line operations:** for example, establishing file structures, copying, deleting, moving files
* **preventive maintenance:** for example, physical and cloud data backup solutions, digital security measures, software updates, patches
* **computer security risks:** for example, malware, Trojans, viruses, phishing scams, identity fraud, ransomware
* **troubleshooting:** identifying problem, establishing a theory of probable cause, testing theory to determine cause, taking action, testing and preventing, reporting
* **wired and wireless computer networking:** for example, network cards, routers, switches, cables, modems, network types
* **evolution of digital technology:** for example, introduction of mobile devices, smartphones, tablets, Internet of Things
* **risks and rewards:** for example,data collection, personal information, privacy concerns, remote hacking, information as a commodity, personal safety, convenience, functionality
* **computational thinking:** key components include decomposition, patterns and generalizations, abstraction, and algorithmic thinking
* **programming concepts and constructs:** classes, objects, data types, constants and variables, expressions and instructions, order of operations, precedence of arithmetic operators, assignment and relational operators, decision and looping structures, Boolean operators, comparison operators, arithmetic operators
* **planning and writing:**
	+ using visual problem-solving models
	+ using variables, expressions, and assignment statements to store and manipulate numbers and text in a program
	+ using decision structure for two or more choices
	+ effectively using looping structures
	+ distinguishing between syntax, logic, and run-time errors
* **impacts of computers and technology on society:** global communication, social media, e-commerce, mobile payment solutions, globalization, human interactions, digital divide, crowdfunding, technology and social change, technology in humanitarian work, technology to assist people with diverse abilities
* **ethical considerations:** may include big data use, equality of access, copyright and fair use, gender issues and technology, cyberbullying, white hat/black hat hacking, hacking for social causes, e-waste, recycling, conflict mineral exploitation
* **cultural appropriation:** use of a cultural motif, theme, “voice”, image, knowledge, story, song, or drama, shared without permission or without appropriate context or in a way that may misrepresent the real experience of the people from whose culture it is drawn
* **environmental sustainability:** e-waste, recycling and disposal, power consumption, renewable energy, server farms
* **digital literacy:** curating a positive online portfolio, digital footprints/dossier, safe online information sharing, cyberbullying, online empathy, reporting online hate/bullying, support and resources, appropriate and professional ways to engage in online forums/communication spaces
* **health and wellness:** for example,cyber addictions; ergonomic issues; and other risks and potential side-effects of overuse of digital tools, including games, gambling, and social media
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