**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** |

| **APPLIED DESIGN, SKILLS, AND TECHNOLOGIES – Computer Studies Curricular 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 |

| **APPLIED DESIGN, SKILLS, AND TECHNOLOGIES – Computer Studies Content – 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 |