CTF Occupational Area Skills, Knowledge and Technologies Lists

CTF outcome: I use occupational area skills, knowledge and technologies.

During Career and Technology Foundations (CTF) challenges or tasks, students are required to use skills, knowledge and technologies associated with occupational areas.

An occupational area is a grouping of courses that focuses on attitudes, skills and knowledge related to specific work areas.

The CTF occupational areas are grouped into five clusters that represent occupational groupings found within industry. CTF uses simplified versions of the Career and Technology Studies (CTS) occupational cluster names. They are Business, Communication, Human Services, Resources and Technology.

Lists that identify occupational area skills, knowledge and technologies used by experts in their field have been developed for commonly taught option classes offered in grades 5-9.

The lists identify some, but not all, of the occupational skills, knowledge and technologies. They may be used as a starting point for identifying the skills, knowledge and technologies to be considered when planning CTF challenges or tasks.

Additional information can be found in these resources:

- [Occupational Areas and Possible Occupations](#)
- [National Occupational Classification (NOC)](#)
- [CTS Compass (including Clusters and Occupational Areas)](#)
- [Bullseye Posters: Explore Occupations by School Subject](#)

The following resources are provided as a service to identify potentially useful ideas for teaching and learning. The responsibility to evaluate these resources rests with the user. **Note:** All website addresses listed were confirmed as accurate at the time of publication and are subject to change.
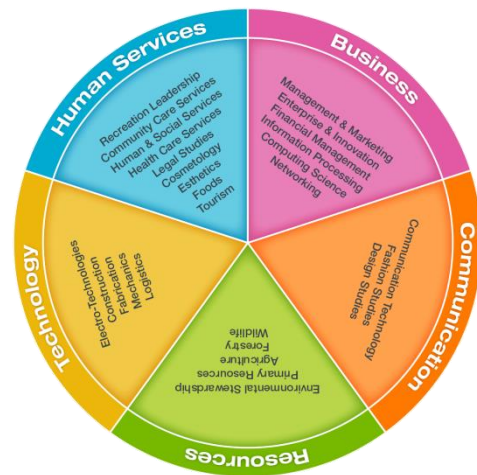
Cluster: Business

The focus is on management, marketing and the use of electronic technologies to access, use and manipulate information within personal, family, workplace, community and global contexts. This cluster challenges students to expand their confidence, experience and skills as innovators and leaders.

Business

Management & Marketing
Enterprise & Innovation
Financial Management
Information Processing
Computing Science
Networking

Financial Management (FIN)
Plan, organize, direct, control and evaluate the operation of an accountant, auditor or financial service.

During CTF challenges, your students may wish to explore some of the following knowledge, skills and technologies used by professionals in the field of financial management.

Students may want to explore
- budgeting
  - Money Metropolis
  - Peter Pig's Money Counter
- interest and how to calculate it
  - Understanding Interest Rates
- benefits and consequences of using credit
  - Financial Soccer
- services offered by financial institutions
  - Financial Literacy for Everyone
  - Financial literacy self-assessment quiz
- debit and credit components of a financial transaction
- purposes of financial statements and their uses
- investment
- the relationship between loss and profit
- the effect of the economy on financial decision making and planning (interest rates, price changes, environmental issues, competition and currency exchange)
- the concept of "paying yourself first"
- taxes
- the difference between a want and a need

Possible Occupations
financial analyst, personal financial advisor, accountant, buyer, treasurer, investment banking analyst, tax associate, financial auditor, financial planner

Information Processing (INF)
Gather information and process it from one form into another.

During CTF challenges, your students may wish to explore some of the following knowledge areas and skills used by professionals in the field of information processing.

Students may want to explore
- designing, creating, organizing, customizing and revising documents and multimedia presentations
- how to resolve minor technical difficulties
- the selection and safe use of the most appropriate tool for the task

- [copyright restrictions and permissions](#) and putting them into practice
  - [Teaching Copyright](#)
  - [Copyright and Creative Commons Explained by Common Craft](#)
  - [Creative Commons](#)
- how to create and manipulate data
- how to represent data visually (e.g., graphs and diagrams)

Possible Occupations

data miner, word processor, typist, data administrator, electronic data processor, information systems consultant, transcriber, information systems quality assurance analyst

Management & Marketing (MAM)
Learn the processes associated with promotion for the sale of goods and services.

During CTF challenges, your students may wish to explore some of the following knowledge, skills and technologies used by professionals in the field of management & marketing.

Students may want to explore
- types of business ownership: sole proprietor, partnership, corporation, franchise, cooperative, conglomerate, multinational and crown corporation
- the relationship between customer satisfaction and profits
- the components of the "marketing mix" as the four Ps (product, price, promotion and place) and both Cs (consumers and competition)
- the impact of marketing decisions (e.g., environmental concerns, delayed purchasing, customer satisfaction)
- the components of a target market
- product merchandising strategies (e.g., scrambled merchandising; narrowing the product line; sampling and product demonstrations; shelf positioning, such as eye-level; and packaging, such as name, colour, size, pictures, brand selection and identification)
- how advertising influences consumers
  - [Media Smarts: Canada's Centre for Digital and Literacy](#)
- marketing skills used to promote and manage a business enterprise

Possible Occupations

property manager, restaurant manager, sales representative, tour director, visual merchandiser, advertising account executive, management consultant, market research analyst, marketing manager

Cluster: Communication

The focus is on providing students with the flexibility to adapt to various situations relating to design, communication and fashion. This cluster includes courses related to art and culture, such as the performing arts, film and video, broadcasting, journalism, writing, creative design, fashion, libraries and museums.

Communication Technology (COM)

Discover and develop skills related to technologies used to design, construct and relay a message for the purpose of connecting, informing, entertaining or selling products.

During CTF challenges, your students may wish to explore some of the following knowledge, skills and technologies used by professionals in the field of communication technology.

Students may want to explore
- the principles of design, including balance, emphasis, proportion (scale), repetition (rhythm/pattern), unity, contrast, harmony, proximity and variety
- elements of design, including line, shape (2-D) or form (3-D), colour, texture, depth (perspective), light, direction (motion), mass (visual weight), tone (black and white) or value (colour) and space (positive and negative)
- audio and video concepts
- appropriate tools and methods for communicating messages
- ways to organize and manage various types of files
- copyright restrictions and permissions and putting them into practice
- how to critique or assess compositions created by yourself or others
- project-planning skills to media/audio/video/print projects
- skills required for preparing and delivering presentations using media of choice
- effective web design
- the role of typography in visual messages
- animation styles and techniques
- design techniques used in the print industry for various media, including digital, offset, screen, vinyl plotting, wide format, sublimation and laser cutting

Possible Occupations
technical writer, telecommunications technologist, television reporter, instrumentation engineering technologist, communication technologist, social media specialist, photographer, editor, animator, illustrator, videographer, graphic designer, audio technician, print maker, 3-D modeller

Design Studies (DES)

Learn about the creative process from conception through to development in architecture, industrial design, engineering, interior design and landscaping.

During CTF challenges, your students may wish to explore some of the following knowledge, skills and technologies used by professionals in the field of design studies.

Students may want to explore
- copyright restrictions and permissions and putting them into practice
- sketches, drawings and models
- appropriate scale when drawing and creating models

- creating and presenting a portfolio
- technical drawing
- steps in the design process
    - [Design Thinking for Educators](#)
    - [Empowering Students With Design Thinking - edutopia](#)
    - [Startup Series: The Importance of Design Thinking](#) – eProjects
    - [Design Thinking and the Future of Education](#) – video
    - [Welcome to the Virtual Crash Course in Design Thinking](#) – Stanford
- project design and management skills
- principles of design, including balance, emphasis, proportion (scale), repetition (rhythm/pattern), unity, contrast, harmony, proximity and variety
- elements of design: line, shape (2-D) or form (3-D), colour, texture, depth (perspective), light, direction (motion), mass (visual weight), tone (black and white) or value (colour) and space (positive and negative)
- purpose and advantages of CAD software

Possible Occupations
architect, civil engineer, interior designer, landscape architect, engineer, urban planner, architectural technologist

Fashion Studies (FAS)
Design, manufacture and market clothing and other textile products as well as study the history, sociology and economics of clothing and textile arts.

During CTF challenges, your students may wish to explore some of the following knowledge, skills and technologies used by professionals in the field of fashion studies.

Students may want to explore
- how fashion artists convey mood, style or attitude
- fashion silhouettes (e.g., A-line, empire)
- basic garment details (e.g., necklines, sleeves)
- copyright restrictions and permissions and putting them into practice
- the use of clothing for self-expression, identity and culture
- the elements and principles of design, including space, visual weight, lines, colour, shape, form, balance, texture, unity, harmony, rhythm, proportion, scale, contrast, emphasis and repetition
- how fabrics are made (e.g., types of weaves, synthetic and natural fibres)
- clothing and textile handling (e.g., identify international clothing care symbols, cleaning, pressing, storage)
- basic construction skills in assembling a sewing project (e.g., selecting appropriate fabrics and notions, laying out a pattern, pinning and cutting accurately, sewing and finishing techniques)
- selecting, using and caring for cutting tools and sewing and pressing equipment
- yarn or textile art techniques (e.g., knitting, felting, quilting, embroidery)
- creative ways to redesign, recycle and restore materials

Possible Occupations
fashion designer, fashion illustrator, fashion model, exhibit designer, visual merchandiser, jewellery designer

Cluster: Resources

The focus is on conservation and the sustainable use of natural resources. Students develop the motivation and commitment to work individually and collectively as private citizens and members of the workforce toward the conservation and responsible use of air, energy, forests, land, water and wildlife.

Resources
Environmental Stewardship
Primary Resources
Agriculture
Forestry
Wildlife

Environmental Stewardship (ENS)

Examine the management and conservation of the environment and propose actions that foster the sustainable development and use of resources.

During CTF challenges, your students may wish to explore some of the following knowledge, skills and technologies used by professionals in the field of environmental stewardship.

Students may want to explore
- the effect of human intervention on the environment (e.g., land-use practices, soil, water and air quality, wildlife habitat and natural areas)
- cultural views with regard to environmental stewardship (e.g., First Nations, Métis and Inuit; French Canadian; and immigrant populations)
- social, economic and political impacts of environmental stewardship
- trends in the consumption and use of resources
- energy conservation and waste reduction
- current local, provincial, national or international environmental stewardship actions and organizations
- sustainable development
  - Sustainability Illustrated
  - Free the Children: Sustainable Development
  - Brain POP: Recycling
  - What is Sustainability? Mocomi Kids
- personal attitudes, actions and lifestyle choices related to sustainable management of the environment
- ecological footprints
  - WWF: Ecological Footprint
  - Sustainability Illustrated: Ecological Footprint (video)
- the role of biological and chemical factors on the environment (e.g., bacteria in soil, oxygen in water, humidity and amount of substances released into an environment)
- processes that potentially distribute harmful substances in the environment (e.g., wind and water currents; soil porosity; and transport, storage and disposal of hazardous materials)
- the role of attitudes, skills, knowledge, decisions and actions in maintaining healthy environments
- the use of non-toxic, recycled, environmentally friendly products and supplies

Possible Occupations

ecologist, toxicologist, soil scientist, hydrologist, greenhouse operator

Wildlife (WLD)

Examine the human relationship to the natural environment, and consider the impact of various human pursuits on species and ecosystems.

During CTF challenges, your students may wish to explore some of the following knowledge, skills and technologies used by professionals in the field of wildlife.

Students may want to explore
- the interrelatedness of factors within a habitat and how the factors affect wildlife populations (e.g., interrelationships among food, water, shelter and space; relationship of soil, water and air variables to plant and animal health; roles of producers, consumers and decomposers; food webs and energy chains; and social organizations and species competition)
- how wildlife species adapt to their environments
- the diversity of wildlife, which may include microorganisms, invertebrates, plants, insects, fish, amphibians and reptiles, birds and mammals
- the interactions of predator-and-prey relationships, food chains and webs and symbiosis (parasitism, commensalism, mutualism)
- the effects that Aboriginal peoples' land-use practices have on wildlife
- conservation and preservation practices that enable wildlife and society to coexist
- social and cultural significances of wildlife (e.g., recreation, spirituality, aesthetics, medicine, mythology, literature and significance to indigenous peoples)
- economic significance of wildlife (e.g., tourism, subsistence and commercial trade)
- environmental significance of wildlife (e.g., water, air and soil quality, diversity of life forms and maintenance of ecosystems)
- the effect of human activity on the structure, behaviour and habitat of a wildlife species (e.g., recreation and tourism, farming practices, housing and transportation choices, subsistence and commercial trade, energy use, deforestation, urban sprawl, construction of roads and buildings, extraction or harvesting of natural resources and pollution)
- wilderness navigation (e.g., using navigational devices, reading and interpreting different types of maps, planning routes, determining waypoints and navigating in inclement weather)
- equipment and techniques required for safe and comfortable experiences in the outdoors (e.g., outdoor cooking methods and leave no trace land use)
- safe and unobtrusive techniques when examining wildlife and habitat
- ethical considerations for conduct when hunting, including hunter-landowner relations, regard for other land users, respect for self, respect for wildlife and respect for laws and enforcement officers
- safe boating regulations, acts and codes

Possible Occupations

interpretive naturalist, heritage interpreter, conservation officer, trapper, hunter, hunting guide, hide and pelt processing worker, animal attendant (zoo), environmental scientist, wetland ecologist, geographic information specialist

Cluster: Technology

The focus is on knowledge areas and skills related to the design, construction, fabrication and maintenance of a product. This cluster includes courses that relate to manufacturing, processing, utilities, construction, mechanics, fabrication, trades supervision, trades contracting, logistics, transportation and heavy equipment.

Technology
Electro-Technologies
Construction
Fabrication
Mechanics
Logistics
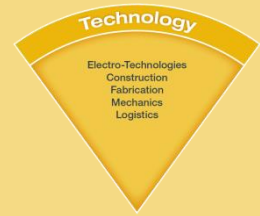
Construction (CON)

Develop skills in the use of tools and materials used in construction processes and safely transform common wood materials into useful products; and learn the various skills of the respective trade.

During CTF challenges, your students may wish to explore some of the following knowledge, skills and technologies used by professionals in the field of construction.

Students may want to explore
- systems that are found in most buildings; e.g., structural, electrical, heating, ventilating and air conditioning, or water and waste removal
- properties of common materials used in construction activities
- methods that are used to communicate ideas and inform the design and construction of a project to meet defined needs (e.g., blueprints or architectural drawings)
- basic materials and the safe operation of tools used in construction
- types of construction projects (e.g., residential, industrial, commercial or civil)
- the appropriate use of tools, materials and processes to layout, cut, surface and size materials; assemble and fasten parts; prepare for finishing; and apply a simple finish
- methods to handle, recycle, store and dispose of materials
- phases in a construction system: planning, constructing, assembling, finishing and evaluating
- ways to improve product quality and productivity
- project management (e.g., preparation of a materials list, project timeline, cost estimate and work schedule)
- scaling techniques to produce patterns or templates

Possible Occupations

bricklayer, carpenter, civil engineer, concrete finisher, gasfitter, floor covering installer, insulator, roofer, scaffold erector, tile setter, cabinetmaker

Electro-Technologies (ELT)

Provide technical support and services in the design, development, testing, production, service, repair and operation of electrical and electronic equipment and systems.

During CTF challenges, your students may wish to explore some of the following knowledge, skills and technologies used by professionals in the field of electro-technologies.

Students may want to explore
- basic electrical components and their systems
- simple electronic circuits
- AC and DC voltage and polarity
- common electrical/electronic cables and connectors used in power, audio and video connections
- methods of converting non-renewable and renewable sources of energy (mechanical, chemical, light and heat) into electricity

- construction of simple power supplies
- the use of multimeters to measure power supply output
- issues related to electrical generation, transmission and distribution systems
- the use of programmable robotics systems in areas such as outer space, medicine, manufacturing and the military
- the building and programing of programmable robotics systems
- how direct control robotics systems are designed and built
- identification of tasks for a robotics system
- the operation of a robot through its predetermined set of functions

Possible Occupations

electrician, communication technician, safety codes officer, electrical engineering technologist, home inspector, security systems installer, instrument technician, electrical engineer

Cluster: Human Services

The focus is on a vast array of challenging and rewarding careers in health care, community supports, recreation, cosmetology, food services, tourism and law.

Human Services
Recreation Leadership
Community Care Services
Human & Social Services
Health Care Services
Legal Studies
Cosmetology
Esthetics
Foods
Tourism

Community Care Services (CCS)

Experience volunteering and developing skills for community-based services in a variety of settings.

During CTF challenges, your students may wish to explore some of the following knowledge, skills and technologies used by professionals in the field of community care services.

Students may want to explore
- basic occupational health and safety practices for maintaining a healthy back
- effective postures for back health (standing, sitting, sleeping, lifting and carrying)
- the basic anatomy of human body systems
- the benefits of volunteers in a community
- the personal rewards available by volunteering (e.g., self-esteem, self-fulfillment, career awareness, employability, enhanced community awareness, health and wellness)
- community volunteer opportunities or placements
- the responsibilities of volunteers and clients
- considerations for personal safety related to volunteering
- personal performance in a volunteer activity or placement

Possible Occupations

manager of volunteer resources, fund development professional, human ecologist, public relations representative, special event coordinator, recreation and sport administrator, manager of non-profit organization

Human & Social Services (HSS)

Learn about occupations related to wellness, human development, family support and professional standards and ethics.

During CTF challenges, your students may wish to explore some of the following knowledge, skills and technologies used by professionals in the field of human and social services.

Students may want to explore
- the twelve key determinants of health as defined by Health Canada
- dimensions of wellness (physical, emotional, spiritual, intellectual and social wellness) and factors affecting personal wellness
- strategies to optimize personal health and wellness
- benefits and application of appropriate hand-washing techniques
- personal opportunities for active living and hobbies that enhance wellness
- maintaining patient and client confidentiality
- signs and symptoms of abuse and appropriate methods of reporting abuse
- respectful communication within different helping relationships, considering choice, dignity and privacy
- food choices and their effects on health and wellness based on information from Eating Well with Canada's Food Guide
- nutritional information and misinformation

- strategies for maintaining a positive body image
- characteristics and qualities of effective leaders/mentors
- personal growth plans for leadership development
- how nature affects wellness in individuals and communities

Possible Occupations

social worker, career development professional, correctional services worker, marriage and family counsellor, mediator, mental health worker, parole or probation officer, psychiatric nurse, psychologist, crisis intervention/trauma counsellor, addictions counsellor

Recreation Leadership (REC)

Develop skills useful for coaching, fitness leadership, sport performance, athletic therapy and leading recreational activities.

During CTF challenges, your students may wish to explore some of the following knowledge, skills and technologies used by professionals in the field of recreation leadership.

Students may want to explore
- how to obtain and maintain current emergency and standard first aid/CPR certification
- liability issues related to athletic first aid
- benefits of proper attire and gear, including a description of possible items that can cause choking hazards or injury
- proper instruction of warm-up, training, practice, competition or active participation, and cool-down skills
- basic hygienic principles to reduce the risk of infection during recreation or sporting activities
- how to prepare for possible emergencies at different venues (e.g., emergency action plans)
- common causes of injuries and illnesses that may occur during recreation or sporting events and activities
- trends in the fitness industry
- community fitness opportunities
- characteristics, benefits and shortcomings of a variety of fitness activities
- fitness plans to achieve and assess individual health and performance-related goals
- mental-training strategies to enhance sport performance

Possible Occupations

personal trainer, recreation coordinator, sports instructor, recreation facility operator, group exercise leader, recreation therapist, athletic trainer, exercise physiologist

Foods (FOD)

Examine the role of food, looking beyond consumption to production, visual appreciation, nutrition, meal planning, economics and preparation; and learn the various skills in the cook trade.

During CTF challenges, your students may wish to explore some of the following knowledge, skills and technologies used by professionals in the field of foods.

Students may want to explore
- food safety and sanitation
  - Be Food Safe
  - Safe Food Handling Tips
- appropriate choices in relation to Eating Well with Canada's Food Guide

- • [planning](#), preparing and evaluating basic food recipes
  - o [Meal planning basics](#)
- • interrelationships among food choices, nutrients and wellness
- • nutritional information on food labels or other sources (see [What is the Nutrition Facts table?](#) for more information)
- • plating and presentation techniques
- • altering and varying recipes according to instructions/wellness (e.g., fibre content, fat content, type of fat and sugar content)
- • serving sizes suggested by Eating Well with Canada's Food Guide
  - o [My Food Guide Servings Tracker](#)
- • contributing factors for successful meal planning (e.g., selecting food, preparing a grocery list, estimating costs and time management)
- • how to select and safely use available tools and equipment when measuring, preparing, mixing, cooking and serving
  - o [Cooking Techniques](#)
- • the culture of food (e.g., ethnic foods, traditions, food blogging, trends, pop culture and farm-to-table movement)
  - o [Culinary Terms](#)
- • food origins (e.g., GMOs, food production, transport and agriculture)
  - o [Understanding Genetically Modified Foods](#)
  - o [David Suzuki Foundation: Understanding GMO](#)

Possible Occupations

baker, chef, cook, kitchen helper, food assembler, bartender, flight attendant, restaurant manager, caterer, dietitian, dietary technician, health department food inspector/environmental health officer, food manufacturer entrepreneur, food stylist, food journalist, food photographer, food/restaurant critic, farmer, community garden coordinator, food distributor food wholesaler, grocery store manager/worker, farmers' market coordinator, agronomist, food scientist

Tourism (TOU)

Look at the impact of tourism in Alberta and around the world, and develop knowledge and skills required for the tourism industry.

During CTF challenges, your students may wish to explore some of the following knowledge, skills and technologies used by professionals in the field of tourism.

Students may want to explore
- • the five industries related to tourism: accommodations, food and beverage services, recreation and entertainment, transportation and travel services
- • motivating factors for travel, including leisure, disposable income, educational opportunities, personal interest and business
- • the barriers to travel, including cost, lack of time, accessibility, age, health and fear
- • motivating factors and trends related to adventure travel , ecotourism and sustainable tourism, extreme travel and volunteer travel
- • positive and negative effects of tourism
- • sustainable and non-sustainable practices used within tourism
- • how the culture of a region influences tourism
- • different mediums and strategies used to promote tourism
- • the importance of providing quality service to customers in order to maintain a favourable business reputation

- rating systems used in tourism; e.g., those used in guidebooks, hotel critics and websites
- sources of information for addressing visitor inquiries
- the roles of attractions, special events and festivals in the tourism industry

Possible Occupations

travel agent, tour guide, flight attendant, outdoor sport and recreation guide, travel counsellor, pilot, bus driver, air traffic controller, taxi driver, heritage interpreter, ticket agent, museum curator, bureau of tourism worker, restaurant worker, retail worker, campground worker, rental car agent, assembly worker, airport security, custom worker, interpreter