CAREER MASH

Inspiring Tech Careers

Endorsed by:

OSCA / ACOSO

The CareerMash Tech Career Resource Kit for Guidance Counsellors and Teachers

Director (video games) • Bi
ss Analyst • Computer Engi
d Prevention • Data Analytic
orensics Analyst • Electronic
nician • Game Designer • Game Developer
Informatics Analyst/Consultant • Help Desk
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Video Game Tester • Web Developer/Web Programmer • Web
• Web Useability Specialist • 2D & 3D animator • 3D Artist • A
(video games) • Biomedical Engineering Technologist • Busine
Computer Engineer • Computer security specialist/Fraud Prev

The future?

CareerMash: Who, What and Why

About CareerMash

CareerMash is part of the Canadian Coalition for Tomorrow's ICT Skills (CCICT), a not-for-profit organization founded in 2007 by a group of visionary business leaders. Our aim is to proactively address Canada's long-term technology talent and skills requirements by encouraging young people to pursue today's wide variety of exciting and in-demand tech-related careers.

Our members include major employers in retail, manufacturing, government, media, finance, information technology, and telecommunications industries. Our partners include school boards, universities, colleges, industry associations, and the governments of Canada, Ontario and Quebec.

As of May 1, 2014, CCICT became part of the Information Technology Association of Canada (ITAC) and will now operate as ITAC's talent division, branded as ITAC Talent. This friendly merger will create a strong new champion for Canada's ICT sector and will provide long-term sustainability to CCICT's talent vision.

For more information about this Kit, CCICT and CareerMash programs, please contact:

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Tech talent is in demand

Over 800,000 people are employed in various information technology occupations across Canada. About half work in the tech sector and half in every other sector of the economy. Today's opportunities call for professionals who combine information and communications technology (ICT) skills with any industry you can imagine – from fashion and music to healthcare and sports. In addition, tech entrepreneurs create thousands of new jobs every year and many of them are in their teens and early 20s.

Despite the unemployment rate of fewer than 3% among tech professionals, the demand for skilled tech workers continues to outstrip supply. The biggest demand and supply gap can be seen for exciting jobs that combine IT with business innovation in areas like healthcare, cyber security and mobile apps.

Youth unemployment and underemployment

One in three university graduates aged 25-29 are in jobs that do not require a university education. Yet, enrolment in tech-related programs has been on decline throughout most of the past decade, and has only recently begun to slightly improve. Girls, in particular, shy away from this field.

Why do so few students choose these in-demand tech careers? Because they often view tech jobs as boring, poorly paid and insecure. Additionally, teachers, guidance counsellors and parents often lack the information they need to help young people make informed career decisions. And let's face it - the technical nature and the rapid pace of change make the field seem complicated and hard to understand.

Today's tech-related careers are interesting, fun, cool, creative and social. They combine information technologies with anything a student can be passionate about – whether it's video gaming or sports. They pay very well – the average wage in ICT is 52% higher than the national average. Tech professionals are in high demand – the unemployment rate in tech jobs is typically around 3% (considered full employment), while the overall national unemployment rate is 7%. However, there is not enough awareness about these rich careers.

Today's tech careers are also incredibly varied. For example, think of tech professionals who work on things like:

• Artificial limbs that patients control with their brains;
• Smart buildings with automatically regulated walls, windows, heating and cooling systems;
• 'Big data' analysis to identify new consumer needs and desires;
• Amazing, complex and creative productions like Canada's Cirque du Soleil;
• Getting consumers the products and services they want, conveniently and at low cost.

Indeed, the list is endless!

CareerMash: changing the conversation

Together with our corporate members and a wide range of partners, CareerMash is working to change the conversation about tech careers. Each year, our programs engage dozens of high schools, colleges and universities. Every semester, over 4,000 high school students meet our professional tech role models right in their classrooms.

The **CareerMash.ca** website helps teachers and youth explore various tech careers to achieve their personal goals and help improve the world. The multimedia site includes interviews with tech professionals, career profiles and pathways to successful careers that mash up tech with industries like fashion, healthcare, sports, education and music.

Business Technology Management (BTM)

You are not alone if you think that tech professionals are either programmers who spend all day in front of a computer screen, or technicians that come to your house to set up the Internet and cable TV.

Contrary to popular belief, Canada's tech professionals are in well-paid, strategically important, prestigious jobs that require business knowledge and skills in equal measure with technology knowledge and expertise.

Business and technology professionals lead tech activities in every sector of the economy as:

• **Entrepreneurs and executives** who lead companies that envision and deliver tomorrow's cutting edge apps, networks, and devices;

• **Consultants, analysts and project managers** who define how tech can improve any organization's products, services, and business activities;

• **Sales and marketing professionals** who help customers understand how today's tech innovations can best meet their needs and goals;

• **Team leaders, managers, directors and executives** who organize and coordinate the tech workforce and its activities.

If there is one area of the tech labour market where demand has consistently outpaced supply, this is it. The gap is partly due to the lack of awareness among students and their parents, teachers and guidance counsellors. Also, the college and university programs that offer business + technology education have been in grave need of updating and expansion.

The Canadian Coalition for Tomorrow's ICT Skills (CCICT), the sponsor of CareerMash, is tackling both of these problems. CareerMash and this Guidance Counsellor Toolkit are among our initiatives for raising awareness. As for post-secondary pathways, in 2009 CCICT launched a bold initiative – the Business Technology Management (BTM) program – that is proving to be a game changer.

CCICT worked with leading employers and universities to design and launch BTM as a university degree/certificate program. It is now offered in 14 universities from coast to coast.

Applications to the program are rising by an average of 24% each year and the placement rate for graduates is over 90%.

Endorsed by Ontario School Counsellors' Association

As a program devoted to increasing awareness about the multitude of career options created by joining technology to just about anything, CareerMash and its website – careermash.ca - were already great resources. With the addition of this Resource Kit, CareerMash is now also becoming an essential part of teacher-counsellors' lists of resources.

Students need more than information about tech careers. They need to feel they are connecting with professionals and that the possibilities for employment are exciting and varied in ways that allow them to "mash up their passions" as well as build a successful career tailored to their strengths and interests.

This new Resource Kit provides that and more. In it, teachers and counsellors will find lesson plans to enrich their programs with resources useful to their narrative counselling approach. Students will find ways to help answer the questions: "Who am I? What are my opportunities? Who do I want to become? What are my plans for achieving my goals?" And, they just might get engaged and excited about their options!

The Ontario School Counsellors' Association is therefore pleased to recommend the CareerMash Resource Kit.

Marie-Josée Pouliotte
President
OSCA/ACOSO

ITAC Talent Partners

ITAC Talent Academic Partners - Business Technology Management (BTM)

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Why Careers in Tech?

Today's high school students are the most tech-savvy ever. They grew up in a digital world with ever-evolving technologies essential to their daily lives.

With **youth unemployment** at record highs, why don't more young people choose tech-related career paths that will prepare them to work in the digital world where they already live and play?

Tech – like any field – isn't for everyone. But that's not the only issue. Many students believe that tech jobs are boring, pay poorly or are insecure. Others find the tech field too confusing to even think about. Parents, guidance counsellors and teachers (not to mention the media) often feel the same way.

These perceptions persist because easy to understand, up to date information on the incredible diversity and flexibility of tech-related jobs has not been widely available.

That's what this CareerMash Resource Kit is designed to change. We want to help bridge the gap between young people who want satisfying, well-paying jobs and employers in every sector who find it difficult to hire qualified people with the skills for today's digital economy.

Tech career mashups are taking off

Today's jobs mash up tech with other specialized fields – like arts, mobile apps, security, healthcare, entertainment, finance – anything you can imagine! They also mash up with business disciplines like team leadership, project management, process design, marketing and sales.

Professionals in these careers devise new ways to enhance personal fitness, protect the environment, transform entertainment, build self-driving vehicles, push the boundaries of social media, create smart apparel and – well – do just about anything.

Many young people are already comfortable with new technologies. They need guidance on how to combine their passions and interests with tech to design their own inspiring careers.

Let's change the conversation

Guidance counsellors play a crucial role in informing students about tech-related careers and encouraging them to consider post-secondary programs that will lead to future success.

This kit will help guidance counsellors improve their understanding of the structure and variety of tech-related careers, explore CareerMash.ca resources through embedded hyperlinks, and choose lesson plans and exercises to use with classes.

Let's change the conversation about tech-related careers and inspire students to prepare for fulfilling futures in one of Canada's fastest growing and important professional fields.

> With youth unemployment at record highs, why don't more young people choose tech-related career paths that will prepare them to work in the digital world where they already live and play?

A Brief Introduction to Tech Careers

What is a Tech Career anyway?

If you aren't sure exactly what tech careers are all about, you're not alone. Tech jobs are everywhere and in constant flux. We all use computers, smartphones, and other tech tools every day. Does this make everyone a tech professional, at least somewhat?

Well, no.

If you are a guidance counsellor or a teacher, you may use specialized applications for scheduling, lesson planning, classroom presentations, or student assessment. The same use of tech tools applies to employees everywhere. But neither you nor they are tech professionals. Rather, they are tech users. Indeed, a key job of today's education system is to teach students how to use information technologies effectively, productively and safely.

But a tech professional is different from a tech user. A tech professional manages, designs, builds or supports the technologies that everyone else uses – or leads teams and organizations that design, market and support these technologies.

There are 3 main aspects to a professional tech-related career:

- **Field or industry sector.** This is a mashup of tech with one or more other things, such as social media, game design, fitness and health, finance or security.
- **Job role.** Many different tech job roles exist in every mashed up field or sector. Fortunately, the general kinds of roles are the same, regardless of the mashup. Every tech field needs people who can perform a similar variety of jobs. CareerMash has organized these into four "job families": leaders, innovators, builders, and supporters.
- **Pathway.** Many different pathways can lead to a tech career. Most obvious is a tech certificate or a degree program from a public college or university, whether for computing alone (e.g. computer science) or a mashup (e.g. game design). Private colleges like TriOS also offer

tech training. But many tech professionals enter the field in other ways. Some turn an academic minor in tech into a career. Others move into tech mid-career. Not to mention university dropouts like Bill Gates, who founded Microsoft when he was 20 years old and is now the second wealthiest person in the world.

Key point: there is no single right way to choose and prepare for a tech-related career. Many people move into the information technology (IT) side of their organization mid-career, after gaining experience in other areas. Or, they retrain for a tech career.

Setting aside career changers, the truth also holds for young students. There is no single right way to choose or prepare for a tech-related career. A few high school students write programs or build robots on their own. Some will enroll in computer science and see where it takes them. Others may have a specific vision, whether to be a game designer, medical technologist, mobile apps entrepreneur, "big data" guru or a corporate tech executive. Having said this, the best way to achieve a successful tech career is by obtaining excellent post-secondary education.

The good news is that Ontario and Canada have some of the best university, polytechnic and college educational offerings in the world. The world's top tech companies – like IBM, Google, Facebook and Amazon – compete aggressively for graduates of our post-secondary programs.

Three planning topics: field, job and pathway

As we said, there are three planning topics: the field or industry sector (the mashup), the job role within that field, and the pathway for getting there. A student can build a career plan with any of these starting points. She may say, "I want a career in health and tech" (the field). Or, "I want to be an innovator who designs new tech-based solutions" (the job). Or, she may simply enroll in a computer science program (the pathway) and choose her field and job role at a later time. Some students will have a crystal clear vision of all three planning topics. For example, "I'll get a degree in bio-informatics, land a job as a researcher in a global pharmaceutical company, and help find a cure for cancer."

Perhaps the most exciting starting point is to identify a tech career mashup in a *field* that inspires a student. CareerMash research has found that high school students who plan on pursuing tech careers tend to see such careers as interesting, fun, cool, creative, and social. If a student is already tech-inclined, what else is he or she passionate about – fashion, music or sports? In any of these areas, there are literally dozens of tech career mashups.

Second is the *job role*, or job role family. Outside tech, in fields like healthcare, job roles are clearly defined. Everyone knows the difference between a nurse and a doctor, but how many people understand the difference between a computer technician and a software engineer?

In order to make things easier to understand, CareerMash has grouped the various distinct job roles into four families: leaders, innovators, builders and support professionals.

Different fields, sectors and industries – even individual employers – hire people with distinctive tech skill mashups that meet their specific, unique needs. They each need their own kinds of tech specialist hybrids. However - and this is a key point - the various job families are pretty much universal. **Regardless of sector, company or mashup, all organizations employ leaders, innovators, builders, and support professionals to organize, design, deliver and maintain their tech activities and projects.**

To summarize, we have covered two key points:

1. ***Where* to find tech jobs, and the *content* of these jobs.** Tech jobs are everywhere, in every sector and industry around the world. Many tech jobs "mash up" tech with industry-specific knowledge and skills. A designer of mobile apps for a major bank must understand the ins and outs of banking processes and rules. To design its innovative Google Glass (a computer built into a pair of glasses), Google employs technologists who also understand optics and human physiology. The explosion of tech career mashups is why we call this project CareerMash.

2. **The *structure* of tech careers.** Like every field, tech has various job roles. Each kind of role entails specific responsibilities, knowledge and skills. Regardless of sector, company or mashup, all employ leaders, innovators, builders, and supporters to organize, deliver and maintain their tech activities and projects.

The following two sections discuss tech career mashups and the four families of tech careers in more detail.

Tech mashups are everywhere

Computers, software and networks are everywhere and increasingly inside everything. They are transforming the way we work, play, socialize, consume, entertain and stay healthy and safe. Much of this is for the better, but there are also downsides: risks to personal privacy, excessive computer use, erosion of traditional literacy and research skills and misguided claims that tech will solve all of the world's problems. CareerMash and our partners in education – along with parents and other mentors – have a responsibility to help students recognize and deal with these issues.

The exciting side of this is how today's careers truly mash up tech with anything you can imagine. Every tech-based innovation or improvement in any field has tech professionals behind it.

Broadly speaking, two kinds of tech career mashups exist, both with ample job opportunities:

A business tech careermash combines technology with knowledge of how a particular organization, in a specific sector, works. For example:

- *Social media, web and app designers* understand, measure and improve social dynamics: how people communicate with one another, share their creativity (e.g. photos and messages), what motivates them to get involved, as well as the visual appeal and logical flow of online content.
- *Health informatics* specialists apply knowledge of healthcare operations and business activities, physician/nurse information needs and diagnostic technologies (like x-ray machines) to design systems that deliver patient health information at the point of need.
- *Digital marketers* analyze huge volumes of online consumer behaviour statistics – often referred to as "big data". They interpret this data to decide how to make websites and apps more useful and appealing to consumers and target information to individuals and predict changes in demand for products sold or promoted online. To do this, they combine tech with knowledge of statistics, digital design, marketing and consumer behaviour.

The second kind of careermash combines information technologies with one or more other technical fields. For example:

- *Game designers and developers* mash up computing with full motion and 3D graphics, visual design principles, techniques of interactive storytelling and gameplay. Like digital marketers, they also require the skills to analyze large volumes of data about the behaviour of game players and to figure out what this means for improving current games and designing even better ones in the future.
- The *digital map designers* at companies such as Google and Apple combine programming with cartography, photography, videography and graphic design.
- *Bioinformatics researchers and developers* combine computing with biology, physics, math and graphics to design realistic representations of cells in motion. These visual models, combined with analyses of genes, proteins and other building blocks of life, yield cures for stubborn diseases like cancer and autism.
- *Investment industry programmers* build models that combine deep technical data on the workings of financial markets with statistics and visualization. Their models predict future market behaviour and influence billion-dollar investment decisions.

Four job families of tech careers

Who is a tech professional anyway? Just about everybody uses information technologies every day for work, play and social interactions. Some activities require skill in using sophisticated tools. Computer technologies help architects design buildings, musicians to compose and create music, and school administrators to plan class schedules. To use these tools effectively, these professionals often require training. They must be adept, confident, and apply creativity and initiative to the technologies at their disposal. But these architects, musicians and administrators are not tech professionals. They just use technology to do their jobs. Indeed, tech professionals have a name for such people: users. To a tech professional, everyone else is either a user or a potential user.

How can students find out which career would best match their personal attributes and interests? Dozens of different tech jobs exist in every field.

Grouping the various jobs into four families makes it easier for students to understand the structure of tech careers, and then match their attributes, interests, and post-high school budgets to a career path. Career families help students understand where various job titles and roles fit into the overall tech career picture.

Information and communications technology (ICT) professionals do one or more of four things – lead, innovate, build or support ICTs and their use. These are the four tech career families:

Leaders
• Manage, direct and lead a tech team or organization to ensure that the people are motivated and the activities are financially sound and meet organizational objectives. *Information technology team*, *group managers, directors and executives* perform such work.
• Work with users to figure out which ICTs (e.g. a handheld app, website, smart device) will help them do things better. Also, they puzzle out how to make the tech easy to use and effective, when the users need it, what price they are willing to pay, the overall project game plan, and so on. In tech innovation companies like Apple or Google, *product designers* often do this work. In 'user' organizations like banks, hospitals, retailers and school boards, a *business analyst* typically does this job.
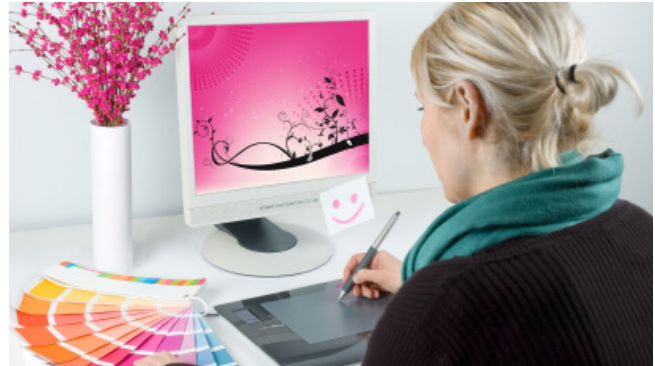
Other roles involved in such planning activities include *technology consultants and sales professionals.*
• Coordinate each of the activities listed here (and others) to ensure they are completed on time, on budget, and with a high degree of quality. This is the work of a *project manager.*

Innovators
• Design the technologies in detail by creating blueprints or plans. A *technology architect, product designer, business analyst, network engineer or web designer* does this important work.

Builders
• Author software code in accordance with the designs. This is the work of a *programmer, software developer or software engineer.*
• Build websites *(web developer)*, mobile apps *(app developer)* or games *(game developer).*
• Create detailed designs of related hardware (e.g. motherboard) – typically the work of a *hardware engineer.*

Support Professionals
• Test the products in the real world. This is the work of *testers or beta testers.*
• Deliver and install tech products to make them available to users. *Technicians* usually perform technology installation.
• Train users on the tech products – done by *trainers.*
• *Technical documentation specialists* create how-to manuals and online information for technology users.
• Provide ongoing tech support to these products. Support is the work of *technicians, help desk and call centre professionals.*

Three important refinements apply to the above:

1. The *titles listed above are just the tip of the iceberg*. Many other roles, job titles and job descriptions exist. People often perform tasks that fall outside of their official job titles.

The boundaries are blurry because, as a relatively new field (less than 70 years old), ICT is not regulated. In medicine, law, accounting, teaching and engineering, professionals must meet rigorous standards for certification and the conduct of their jobs. Employers are expected to help enforce these standards. In computing, employers are free to choose anyone to perform any sort of tech job. Work standards are voluntary. True, some tech professionals have engineering degrees (software and electronics engineers, for example), but employers are not required to hire software engineers to perform software design or development. This lack of boundaries also helps explain the pace and range of innovations that is so apparent in the world of tech.

2. *Few tech professionals stick to one job throughout their careers.* Someone might start out as a technician and move into programming or team management and eventually into senior management. Tech professionals sometimes move into other business areas. Their learning pathways will include informal self-training, post-secondary foundations, continuing education and on-the-job training.

3. *The flow of work described is typical, but not ironclad.* A creative person or team might combine several phases into one, such as going almost immediately from conception to programming and development. The Social Network movie shows how founder Mark Zuckerberg did exactly this when (with helpers) he conceived, designed, and made rapid changes to what ultimately became Facebook – all in his Harvard University dorm room. Tech is often a fast-paced, creative field that has many routes to success.

Pathways to tech careers

As mentioned, there is no single pathway to any specific tech career role. Employers usually look at the whole package – his or her education, personality, skills, attitudes, ambitions, interests and experience to decide whether the individual is the right fit. Some career changers and self-educated technology lovers get tech jobs even though they lack formal job-specific training. Most importantly, for many jobs, employers look beyond technical and subject matter capabilities for self-management, verbal and written communication, leadership and business skills. Canadian employers consistently say these so-called "soft skills" (often the hardest to obtain) are the most sorely lacking. Any student who wants a great career – in any field – must learn these capabilities.

The field of information technology does not have any formal apprenticeship setup in Canada. Many employers offer their own versions of on-the-job training and career progression for new employees. They also work with colleges, polytechnics and universities to provide positions for students.

Following is the landscape of post-secondary career pathways available to today's high school graduate:

- Ontario's 19 **universities** provide the most diverse and advanced range of pathways. Every Ontario university has a computer science faculty (or equivalent) that has 4-5 year degree programs. Many also have 5-year engineering programs in software and/or electrical/electronics engineering. Nearly all have a variety of tech "mashup" programs, like business and tech. Business Technology Management (or similar) programs are available in many universities, typically with a Commerce degree. Increasingly, universities provide co-op and internship programs. Several also give students the opportunity to create their own business startups, through programs such as Ryerson University's Digital Media Zone and University of Waterloo's Velocity Incubator. A graduate can directly move into a job, an MBA or advanced technical study.

- **Polytechnics** are intermediate between colleges and universities. They offer technically strong, job-oriented programs – typically 3-4 years in duration. Though they have fewer offerings, their programs are comparable to a university undergraduate degree. Ontario's polytechnics are typically affiliated with colleges. Those that offer information technology programs as of March 2014 are Conestoga College Institute of Technology and Advanced Learning, Humber College Institute of Technology and Advanced Learning, Seneca College of Applied Arts and Technology, and Sheridan Institute of Technology and Advanced Learning.

- **Public colleges** offer a wide variety of job-oriented programs ranging from 2 to 4 years, many with co-op options. For example, Seneca College offers 15 different certificate programs in its Information & Communications Technology faculty alone. These range from two-year technician programs to a four-year "Bachelor of Technology – Informatics and Security" co-op that mashes up informatics, security and law. In other faculties, Seneca offers tech mashups like computer animation, aviation technology, social media, interactive media design and bioinformatics.

- **Private colleges** tend to cater to people in early or mid career. The best colleges are very job focused and well regarded by students and employers. TriOS College, for example, has a strong focus on tech education. Its programs include web design, video game design, programming and technician training. It also offers a 90-week, broad ranging Information Technology Professional diploma - an advanced support level program whose graduates implement and maintain computer systems, mobile devices, data, applications and so on.

- Some employers hire technically proficient high school graduates and provide them with **on-the-job training**. This typically applies to support jobs such as hardware/network technician and telephone support. For someone who is considering a tech career, this can be a stepping-stone to further education, whether from an employer, a public institution, or a private college.

How to choose a pathway for a particular student? Let's focus here on our four families of tech careers – Leader, Innovator, Builder and Support Professional.

- The most direct pathway to a Leader type job is via Business Technology Management (BTM) or a similar program. As of March 2014, BTM is offered in many Ontario universities. Over the coming years, such programs will also be available through colleges. Besides the overall BTM program, students can obtain training in specific kinds of leadership skills. For example, Seneca College offers a program in project management. To progress further, consider combining BTM with a Master's of Business Administration (MBA).
- Innovators require strong technical skills in computing as well as any other field of interest (e.g. telecommunications, graphics, interaction design, analytics, robotics, biology). They typically have a university or very strong college education in engineering, computer science or possibly an interdisciplinary program that mashes up tech with their passion. Graduate degrees (masters, doctorates) are also something to consider.
- Builders can come from anywhere – university, public or private college education or on-the-job training.
- Support professionals typically have college education or on-the-job training.

Tech related careers can be found in all of the post-secondary pathways:

• Apprenticeship
• College
• University
• Workforce

Meet Ontario Ministry of Education expectations:

• **Choices into Action**
  Student development, interpersonal development, career development

As an educator in any subject area, this Resource Kit can help you meet the expectations outlined in the following Ministry of Education policies and programs:

• Ontario Schools, Kindergarten to Grade 12, 2011, p. 24 Section 2.4 **(pdf)**
• Growing Success: Assessment, Evaluation and Reporting in Ontario Schools, 2010, p. 14 **(pdf)**
• Creating Pathways to Success: An Educational and Career/Life Planning Program for Ontario Schools, 2013, p. 9 Sections 2.3.1, 2.3.2 **(pdf)**

How to Explore Tech Careers at CareerMash.ca

Watch the Video
Learn more about how tech careers are changing our lives and the world around us with the: **"Tips & Advice on Finding a Tech Career"** video.

Discover Tech Career Types
Learn about four career types of tech professionals: **Leader, Innovator, Builder and Support Professional.**

Meet The Pros – Stories about how tech professionals are combining tech-related knowledge and skills in different fields. These stories provide important insights for students such as:

• Career paths are often non-linear.
• Individuals with similar tech-related careers may have taken very different routes to their current roles.
• Early life experiences can form interests and skills that blossom into a career in tech.
• The varied fields of experience and educational backgrounds of tech-related workers add value to what they can achieve.

Career Profiles – Tech careers that are in demand.

Career Mashups – Profiles of hybrid careers in emerging areas like art, sports and retail.

Cool Stuff – Hot jobs videos and simple tech tools to try out for making a game or building a website.

Workplaces – Profiles of organizations that offer tech-related careers.

Industries – Highlighted industries where tech mashes up with other specializations.

Explore Education Pathways

Business Technology Management (BTM) – Post-secondary programs offered across Canada that mash up business and technology skills.

After High School – Highlighted post-secondary programs leading to tech-related occupations.

More Resources

Toolbox – Activity and lesson plan ideas for educators.

Role Model Program – Tech professional visits to high school classes to share their career stories with teenagers.

Blog – Cool careers and new developments in tech.

Connect with CareerMash

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• **YouTube**   • **LinkedIn**

CareerMash
Tech Job Families

Grouping the various jobs into four families makes it easier for students to match their personal attributes to a career path. Career families are also easier to understand than specialized job titles like analyst, project manager, systems architect or consultant.

Every tech job fits into one main family but includes attributes of other CareerMash families. For example, some people design and build mobile apps to mash up 'Innovator' and 'Builder' career types. Others may manage teams and also do tech training, mashing up 'Leader' with 'Support Professional'.

See the table on the next page that defines each of the families and allows students to assess their personal qualities. You can also refer students to the table on careermash.ca at this link – **CareerMash Families Comparison Table.**

CareerMash helps students get started by grouping tech jobs into four families – Leader, Innovator, Builder and Support Professional.

CareerMash Tech Job Families Comparison Table

| Art   Humanities   Crime Solving   Education   Music
Entrepreneurship   Fashion   Retail   Sports   Health |

	Leader	**Innovator**	**Builder**	**Support Professional**
Description	**Leaders** can be among the most influential and best paid while helping to change the world through businesses and organizations across every sector. Inspirational Leaders play pivotal roles in making change happen by knowing how to apply tech to do stuff better, faster and cheaper. They lead and others follow.	**Innovators** mash up several areas of tech skills to operate at the cutting edge of the future. Imaginative Innovators are ambitious gurus who love to continually learn, analyze and create. They transform possibilities into reality and are never satisfied with the status quo.	**Builders** are essential in a range of tech careers focused on turning great ideas and information into reality. Builders write the software or organize the data that make the electronic brains of computers into fun or useful parts of our lives. No technical challenge or mountain of data is too big for the logical talent of a Builder!	**Support Professionals** are found in every sector, using their analytical skills to solve problems with all the different computer-based technologies we rely on every day. Ingenious Support Professionals are behind-the-scene heroes who never get bored because they are too busy keeping our digital world humming while also training people on how to get the most from tech.
Personal qualities	• Organized • Determined • Persuasive • Audacious • Resourceful • Risk taker • Communicator	• Creative • Inspired • Leading edge • Imaginative • Resourceful • Ingenious • Curious	• Logical • Organized • Effective • Conscientious	• Analytical • Cooperative • Effective • Curious • Rigorous • Observant • Perceptive • Patient
Job examples	• **Business Analyst** • **Systems Analyst** • **Project Manager** • **Information Technology (IT) Consultant** • **Health Informatics Analyst/Consultant** • **Tech Product and Service Sales** • **Tech Marketing** • **Tech Entrepreneur**	• **Mobile Apps Designer** • **Game Designer** • **Sound Designer** • Graphic Designer • **Ethical Hacker/Cyber security** • **Data Analytics Specialist** • Bioinformatics Researcher • **Robotics Engineer** • **Electronics Engineer** • **Computer Engineer** • Usability Specialist • Software Architect	• **Software Programmer** • **Web Developer** • **Mobile Apps Developer** • **Game Developer** • **Interactive Media Developer** • **Database Administrator**	• Biomed Technician • Training/Documentation Specialist • Systems Administrator • **Video Game Tester** • Quality Analyst • **Network Manager** • **Help Desk/IT Support Specialist** • **Electronics Technician** • **Web Technician**

CareerMash Tech Job Families Comparison Table (continued)

**Art   Humanities   Crime Solving   Education   Music
Entrepreneurship   Fashion   Retail   Sports   Health**

	Leader	**Innovator**	**Builder**	**Support Professional**
Mash Up Tech With	Business Industry knowledge	Another technical field of your choice	Project management Digital media	Industry technology knowledge
What to learn	IT + business, (e.g. **Business Technology Management (BTM),** or MBA programs).	Specialized computer, engineering + can add a non-IT tech field	Computer science Web / digital media Database, Networking	Computer technician Specialized technician
Where to learn	University / College / Polytechnic	University / College / Polytechnic	University / College / Polytechnic	College / Employer / Private training
Celebrity	Steve Jobs, former CEO of Apple	James Cameron, Director of Avatar	Mark Zuckerberg, Founder of Facebook	
More info	**more about Leaders**	**more about Innovators**	**more about Builders**	**more about Support Professionals**

CareerMash
Tech Job Families

Leader

In 2004, **Mark Zuckerberg** launched Facebook in his university dorm room at the age of 20 when he was in second year at Harvard University. In 2009, former Yahoo employees **Peter Acton** and **Jan Koum** founded WhatsApp, a messaging tool that has taken the world by storm – leading to acquisition by Facebook in 2014. In 2012 **Ginni Rometty** became the first woman CEO of IBM, the largest (435,000 employees), oldest (founded in 1911) and continually successful computer company in the world.

These successful tech **Leaders** all launched their careers as Innovators, and also did their fair share of Builder and Support tasks. But they were first and foremost effective visionary leaders who led their companies to produce and market breakthrough products and services.

Even though not all leaders land at the top of the heap, they remain valuable multi-disciplinary professionals in every organization. They lead business management, tech design, development and implementation – ensuring that great ideas come to fruition and truly make a difference. Leaders mash up tech with business knowledge and skills like marketing, financial analysis, team leadership and interpersonal communication. And today, thanks to college and university programs like Business Technology Management, you can train to be a tech leader right from the start!

Leader-type jobs include:

- Managing, directing and leading a tech team or organization to ensure that its people and activities are motivated, financially sound and meet organizational objectives. *Information technology team and group managers, directors and executives* perform such work.

- Working with users to figure out how and which technologies (e.g. handheld app, website, smart device, complex application) will help them do things better or have more fun. They also puzzle out how to make the tech easy to use and effective, when the users need it, what they are willing to pay, the overall project game plan, and so on. In tech innovation companies like Apple or Google, **product designers** often do this work. In "user" organizations like banks, hospitals, retailers and school boards, a **business analyst** typically does this job. Other roles involved in such planning activities include **technology consultants and sales professionals.**
- Coordinating each of the activities listed here (and others) to ensure they are completed on time, on budget, and to the highest degree of quality. This is the work of a **project manager.**

What makes Leader jobs great?

- They fill the key role that links tech to the needs and desires of users, customers and organizations.
- Organizations count on tech leaders to ensure that projects succeed in every way.
- Good leaders are respected and well paid.
- Demand for qualified tech leaders outstrips the supply. With approximately 200,000 leader-type jobs in all sectors across Canada, this is a high potential opportunity for any student.

The most direct pathway to a leader-type job is via a Business Technology Management (BTM), or a similar program. As of March 2014, BTM is offered in many Ontario universities. Over the coming years, such programs will also be available through colleges. Besides the overall BTM program, students can obtain training in specific kinds of 'leader' skills. For example, Seneca College offers a program in project management. To really progress your knowledge, combine BTM with an MBA.

Here are some examples of leaders from CareerMash Meet the Pros:

Melody Adhami

- President, Chief Operating Officer and co-owner of Plastic Mobile.
- Realizing that "mobile is the future" when Apple launched the iPhone in 2007, Melody co-founded the company.
- "I find myself wearing many different hats. The most important thing for me is to make sure that the people I work with like what they're doing and want to do what they do. I also develop mobile strategy for our clients. We create things that people can only dream about. When you produce strong work, the word spreads."
- Known as "the queen of apps", Melody started with a BSc in biology and psychology. She went back to school for an MBA, which she completed in 2006.

Melody Adhami

"Being a female in an industry that's heavily dominated by males can be intimidating. Don't let that get in the way. Arm yourself with knowledge."

Melody Adhami, COO and co-owner of Plastic Mobile

Akshay Kochar

- Digital Project Manager, Agility Inc.
- Studied Digital Enterprise Management – a combination of business and technology.
- Landed a job at Agility a day after he graduated university.
- Works with big name clients such as Cineplex, Shoppers Drug Mart, the Oprah Winfrey Network and Glow Magazine to maximize their website performance and design.

Akshay Kochar

"Combining business and technology courses can lead to a variety of fun and in demand careers. With this skill set, you'll never feel like you're stuck in one career area for life."

Akshay Kochar, Digital Project Manager, Agility Inc.

Khaled Al-Qinneh

- IT Project Manager, Royal Bank of Canada (RBC)
- Khaled coordinates projects with team members so that goals can be met on time, on budget and with excellent quality.
- "My work is entirely based on the ability to successfully coordinate everyone's roles and responsibilities to best serve the project's goals. I am lucky to work with lots of business and technology specialists. This is a perfect career if you like tackling challenges on the go and trying to get the best out of people. This career also has a lot of growth potential.
- Khaled graduated with a bachelor of commerce degree in Business Technology Management from Ryerson University, where he also earned a certificate in project management.
- While at Ryerson, he landed a co-op placement at RBC as a systems analyst. After graduation, RBC hired him full-time.
- "The BTM program teaches the right balance of business and technology," Khaled says.

Khaled Al-Qinneh

Innovator

Creativity is the skill that defines every excellent innovator – whether designing a world leading game, a mobile app or a new wearable tech device.

And career mashups are everywhere. Each of the below innovators mashes tech with other deep technical skills in unique ways. danah boyd (yes, she uses no capitals in her name!), the social media researcher, combines tech with sociology, psychology and excellent writing and speaking skills. Markus Persson, the Minecraft inventor, combines skills in graphics, visual design, storytelling and gameplay. To invent the Google search technique, Larry Page and Sergei Brin combined computer science with advanced statistics. Since then, Google Innovators have mashed the engine's technology with mapping, translation, graphics, analytics, optics (Google Glass), mobility, self-driving cars and more.

Innovator job titles often include the word 'designer' – as in product designer, software designer, web designer, app designer or game designer. People with 'engineer' in their title or professional credentials – such as software engineer, electronics engineer, robotics engineer or network engineer – are often innovators as well.

Innovators require strong technical skills in computing as well as in other fields they are interested in (e.g. telecommunications, graphics, interaction design, analytics, robotics, biology). They typically have a university or college education in engineering, computer science or possibly an interdisciplinary program.

What makes Innovator jobs great?

- They shape the cutting edge of technology in computing and other inspiring fields.
- With today's pace of innovation, you can build just about anything imaginable.
- You get to change how people, organizations and communities work, play, flourish and communicate.
- You get to work with some of the smartest people in the world.

"
Most importantly, I learned through experiences of self-exploration to never give up, never take no for an answer from adults and look beyond what was obvious in my everyday life because the best opportunities are always hidden."

Eden Full, Solar tech inventor

Here are some examples of Innovators from CareerMash Meet the Pros:

Natalie Panek

Natalie Panek
- As a Mission Systems Engineer at MDA Space Missions in Toronto, Natalie helped design the next generation Canadarm robot and did "robotic dexterous tool design for orbital debris mitigation." In other words, she helped create robots that clear up garbage outside of space stations!
- Her game plan: "For as long as I can remember, my goal has been to travel to outer space. For me, it wasn't enough to just want to be an astronaut - I was going to be an astronaut."
- Natalie is a huge advocate for encouraging women to dive head-on into challenging careers and take risks.
- She studied mechanical engineering at the University of Calgary, followed by a Masters in aerospace engineering from the University of Toronto Institute for Aerospace Studies.
- In 2013, CBC named Natalie one of the 12 young leaders changing Canada.

Keith Courtoreille
- Keith and his team design (and build) mobile apps and complex logistics software that help turn a company rooted in the 19th century – CN Transportation – into a 21st century leader.
- He travels to expos and events to learn about new technologies and then brings his findings back to CN. Keith and his team
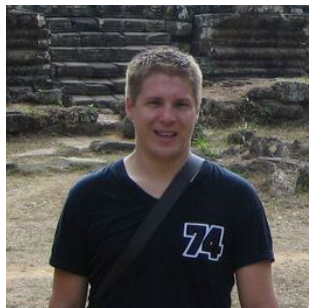
Keith Courtoreille

envision new ideas, prototype and test them, and put the best ones forward for adoption.
- The CN mobile app lets customers like retailers and mining companies book and manage shipments from their smartphones.
- He has undergraduate degrees in computer science from the Northern Alberta Institute of Technology, in business from the University of Lethbridge and an MBA from the University of Montreal.

Gary Bader
- Gary and his bioinformatics research team at the University of Toronto mash up biology, computer science and engineering to map the millions of molecules and systems inside a human cell.
- "We're building a Facebook for the proteins in human cells that will help find a cure for severe autism among children," Gary says.

Gary Bader

- Gary got a double undergraduate major in biochemistry and computer science from McGill. He went to graduate school at the University of Toronto where he joined the innovative Blueprint project - "the first Facebook of proteins." He did post-doctoral work at Memorial Sloan-Kettering Cancer Center in New York and then came to the University of Toronto to start his research lab.

"For as long as I can remember, my goal has been to travel to outer space. For me, it wasn't enough to just want to be an astronaut – I was going to be an astronaut."

Natalie Panek, Mission Systems Engineer, MDA Space Missions

Builder

What's the difference between an innovator and a builder? Using the comparison of the construction industry: tech innovators are like building architects. They devise the vision, design and detail blueprints for a project. Tech builders are like construction builders. They turn the blueprints that they receive from tech innovators, and turn them into reality – in this case, computer software, devices, and the like.

In the real world, the distinction is not always so clear. People with the ideas (innovators) very frequently also bring those ideas to life – they build (program) the apps they've thought up, for example. You can be sure that most of the people mentioned on the preceding pages – like Mark Zuckerberg (of Facebook), Sergei Brin (Google), Melody Adhami (Plastic Mobile) and Gary Bader (University of Toronto) have done their share of programming and other kinds of tech builder work.

But, once a project reaches a certain size, a division of labour occurs. A website development project might include leaders (e.g. client relationship managers, project managers), innovators (e.g. web designers, information architects, usability designers) and builders (e.g. software programmers, graphic designers, database specialists). A large project has many more builders than innovators. In other words, there are lots of jobs for builders!

Here's a fun assignment. Next time you (or your students) see an animated movie, stick around for the credits at the end. Take notice of the many people and job titles associated with each of the cartoon characters in the movie. You will be surprised - the vast majority is tech builders!

When tech professionals build, they bring big and complicated ideas to life. Computers, tablets and smartphones would not exist without builders who write the software and organize the data that turn these devices into creative, fun and useful parts of our lives. Mobile app developers, web developers, database administrators, software and electronics engineers often have jobs as Builders.

What makes Builder jobs great?

- Ability to work on exciting, often cutting edge tech projects and then say: "I made that!"
- Learn constantly, challenge yourself.
- Collaborate with, and learn from different people who bring unique knowledge, skills and backgrounds to a project.
- Potentially move into innovator or leader jobs as you progress through your career.

Builders learn their skills in a variety of places – university, public or private college and even on-the-job training.

" Be curious. Take stuff apart – learn first-hand how things work."

April Blaylock, Robotics Developer, Aeryon Labs

Here are some examples of Builders from CareerMash Meet the Pros:

April Blaylock – **Watch the video >>**

April Blaylock
- April programs drones - the unmanned aerial vehicles that are transforming war, surveillance, mapping, agriculture, photography and a host of other fields.
- She is and Unmanned Aerial Systems Engineer at Aeryon Labs in Waterloo, Ontario - one of the world's leading drone companies.
- Aeryon drones have helped take down drug lords in Central America and supported Libyan rebel forces.
- "We humans use our eyes so that when we're moving left, we see we're moving left. Using the onboard camera, I've given that ability to the vehicle. When it looks down at the ground and sees the grass moving one way, it must be moving the other way. We turn that into mathematical functions that represent location."
- April has undergraduate and master's degrees from the University of Waterloo in mechatronics (a mashup of mechanical, electronics, control, software and computer engineering for the development of robots and other smart gadgets).

Chris Barless
- Chris is a "Ninja programmer" of innovative mobile and web apps at **Pilot Interactive** on Queen Street West in downtown Toronto.
- Pilot is a digital marketing and branding startup known for its "youthful and exciting design style and ability to execute technologically".

Chris Barless

- Chris **describes himself** as a "front-end developer with a voracious appetite for front-end frameworks, great design, and user experience."
- "Samsung **asked us** if we could live-stream Arkells concert on their new tablet and we said, "well, we've never done that before, but probably. So we learned how the tablet works and we pulled it off in 3 weeks!"
- "We have the attitude that nothing is impossible. It's just a matter of how hard you want to work to achieve it."
- Chris dropped out of university. "I was bouncing around from one job to another - doing construction, waiting tables or bartending." He discovered tech and took a year to teach himself programming. "When I started at Pilot, I said, 'this is it!'"

Chrislyn Tziortzis
- Chrislyn is a Senior Media Specialist at the Government of Ontario.
- "One day I work on the website, the next day I make posters and graphics, shoot videos and develop podcasts!"
- When not in her downtown Toronto office, she travels around the province to consult with clients and advance tech initiatives.

Chrislyn Tziortzis

- "We focus on getting real-time information and data to Ontarians, being quicker, smarter, and more interactive."
- Chrislyn also mentors other women. "I see the need for women in IT and I want to promote this."
- Chrislyn completed a Business Technology Management undergraduate degree, then an MBA in technology and innovation at Ryerson University.
- She entered the Ontario public service through its 2-year internship program.

"Some people outside IT think it means fixing computers. Today, IT is all about interaction. I work in multimedia IT – many people don't even know it exists!"

Chrislyn Tziortzis, Senior Media Specialist at the Government of Ontario

Support Professional

When you dial a Bell, Rogers or Telus call centre for help with an unruly network connection or smartphone, you get help from a Support Professional. For most of us, everyday contact with the tech world is through Support Pros like these. Support Professionals install, repair and maintain the exploding array of technologies we all depend on. Support Professionals also provide documentation and training: online, in person and telephone support; and the testing of new products and services.

Tech Support Professionals are everywhere. In consumers' homes and in business offices they install and repair cable TVs, phone and Internet connections. In hospitals, they install and maintain heart monitors and X-ray machines. In banks and government agencies, they train users on new applications and answer distress calls via the "help desk". Video game tester, biomedical engineering technologist, computer and network technician are just some examples of the job titles in tech support.

What makes tech support jobs great:

- Support Professional who solves a problem can take pride in technical mastery – and also enjoy the delight of the technology's users!
- Support is a great way to get into the tech field without a university degree.
- This job market will always be stable and growing for two reasons. First, tech continues to expand into more areas of life and work. Second, the vast majority of tech support activities must be conducted on the spot - very few tech support jobs can be shipped offshore.

Like Builders, Support Professionals (depending on the job) can come from anywhere. Many have college or on-the-job training. But as our profile of Natalie Silvanovich below shows, some have advanced university degrees.

"
The job changes with each new technological innovation, allowing me to take on different tasks, learn and discover new talents and simply have fun at work."

Amanda Williams, Technical Analyst, Pre-Production Services, Royal Bank of Canada.

Here are some examples of Support Professionals from CareerMash Meet the Pros:

Amanda Williams

Amanda Williams
- Technical Analyst at Royal Bank of Canada (RBC)
- Amanda works in IT pre-production services, which test new technologies before they are launched to RBC's many different divisions.
- Did you know? About 10% of RBC's 60,000 employees work in IT; they are among the best-paid members of the RBC workforce!
- "Our bi-weekly meetings with tech suppliers are about the hottest new hardware and software on the market. They help keep our team focused and help us choose the next tech innovations for our test lab."
- Shortly after joining RBC as a young graduate, Amanda gained big responsibilities including daily management of an inventory of assets as well as forecasting, purchasing, and coordination of equipment for the bank's various testing environments.
- Amanda recommends students start exploring careers early. "I wish someone gave me this advice while I was in university. I would have tailored my program to better fit my career aspirations."
- Amanda graduated with a BA in Communications, Culture and Information Technology (CCIT), with a certificate in Digital Communications, from a joint program between the University of Toronto and Sheridan College.

Victor Yan
- Victor is in charge of maintaining large-scale printers and copiers at Xerox Canada.
- He often must simply show people how to use a printer properly: "People expect to hit the print icon and have it work. But sometimes it doesn't!"
- At the other end of the spectrum, Victor uses his skills and intelligence to solve big mysteries. Once he had to fix a printer that didn't work and kept showing an error message that pointed to a computer component. Across

Xerox, technicians were replacing the component but the problem continued. Victor figured out that the issue was with the print head that puts ink onto paper. Victor's name is now posted on the Xerox Knowledge Base next to his solution!
- "Being an on-site specialist is challenging and very rewarding. I like helping people. There is always something new to learn. It's fun!"
- Victor got a diploma in graphic design at Seneca College, and in film and TV at the Toronto Film School. In 2005, a Xerox recruiter met him and offered him a job while he was working at Staples/Business Depot.

Victor Yan

Natalie Silvanovich

Natalie Silvanovich
- Natalie is a Security Researcher at BlackBerry in Waterloo, where she tests products to ensure that their legendary bulletproof security stands up to every imaginable attack.
- As BlackBerry recovers from some market challenges, cybersecurity is core to its strategy. This puts Natalie's work front and center!
- "You need to discover new ways that a hacker could break something that's never been done before. If something prevents the hacker from exploiting a security risk, they will think creatively around that barrier."
- Natalie has closed several major security flaws in products for governments and large organizations. But we can't share the details for security reasons!
- "It's really satisfying to find an issue. It's even more fun if it was completely unexpected and no one can believe you managed to fix it."
- In her spare time, Natalie is active in the Kwartzlab Makerspace where hackers get together to do fun tech projects. Natalie's project there is a **Tamagotchi hack**.
- Natalie grew up in Vancouver and has an electrical engineering degree from the University of British Columbia.

Your Passion + Tech = Dream Career
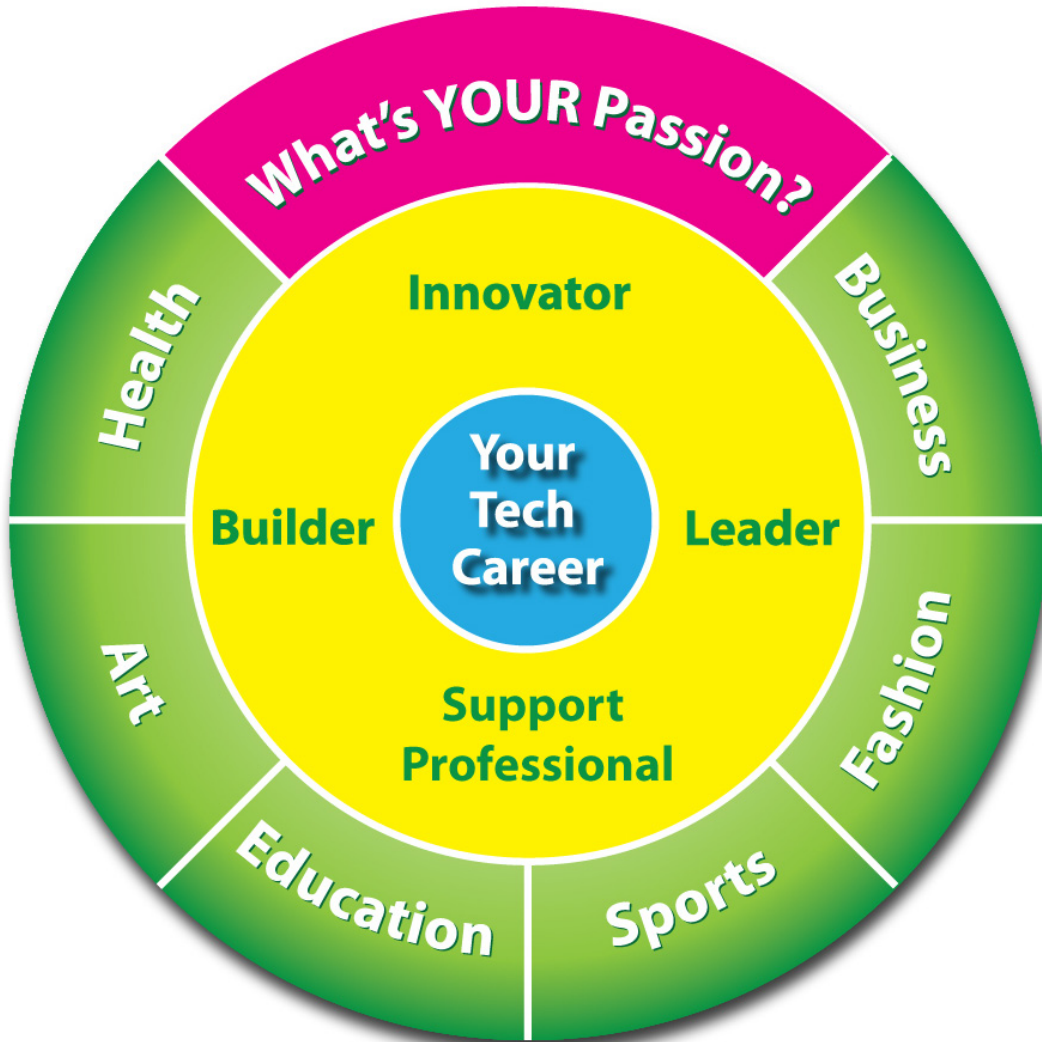
Any student can mash up tech with their passions to embark on a dream career!

Student Activity and Discussion Ideas: Grades 9-12

This section of the Kit provides activities for guidance counsellors and teachers to use with students. These suggested activities have students work through some of their individual interests and career goals as well as explore CareerMash.ca for information on today's in-demand and inspiring tech careers.

1) Mashup Scavenger Hunt

Learning Goals: Students isolate some of their personal interests and use **CareerMash.ca** to find tech careers and post-secondary programs that combine tech with their interests.

Success Criteria:
Students will:
• Understand that tech-related careers are diverse and include a variety of pathways for students with any competence level or interest.
• Identify at least one tech career that mashes up their strongest passion(s) or interest(s) with technology.
• Identify some relevant post-secondary programs.
• Develop the creative inquiry and research skills needed to navigate CareerMash.ca.

Minds On:
• Students brainstorm one of their major interests, such as art/graphics, business, social media, healthcare or robotics. They use these interests as starting points to explore technology careers on CareerMash.ca.
• If students are having a hard time pinpointing their interests, the facilitator asks them what classes they like and what they like to do in their free time.

Action:
• Students browse CareerMash.ca and use the search tools to find content that relates to their interests. Students think up three to five supplementary keywords for the target interest(s) to maximize search results.

• Starting with their strongest interest, students list careers and post-secondary programs that mash up their interests with technology. Students read the CareerMash posts to identify which careers and programs are most interesting to them, and why.
• **Ideally students conduct this exercise for three interests in case some interests do not yield many CareerMash results.**

Assessment For Learning: Exit Pass
Pass out Exit Cards to students that ask the following:

1. Three things I learned today...
2. Two tech careers I can imagine myself working in...
3. One question I still have...

Collect them and address their questions at the beginning of the next class.

IPP Components: Who am I? Who do I want to become? What is my plan for achieving my goals?

Differentiated Instruction:
• Students identify choices with this exercise, namely in what areas of interest they decide to research and in how they prioritize those interests.
• The CareerMash.ca website provides information both in written content and through videos, allowing students to absorb information through a variety of formats

Assessment Strategy: Assessment For Learning (Show of hands, Exit Pass)

2) Thumbs Up, Thumbs Down

Learning Goals: Students will understand the role that technology plays in their lives as compared to the lives of previous generations, and will consider how technology might impact their future careers.

Success Criteria:
Students will:
• Build inclusion.
• Assess prior knowledge about their experiences with technology.
• Appreciate their levels of skill in the area of technology.
• Develop interpersonal and communication skills.

Minds On:
• Counsellor or teacher asks the class questions about their experiences with technology, using "Thumbs Up, Thumbs Down" as the student method of response.

Suggested (Assessment For Learning) "Thumbs Up, Thumbs Down" questions: Thumbs up or Thumbs down if:
• You like to play video games.
• You have an account on Facebook or Twitter.
• You have an account on Snapchat.
• You like to text.
• You regularly use a cell phone.
• You have some idea how the computers in a car work.
• Your family says you spend too much time on the computer.
• You find computers are sometimes too slow.
• You know something about HTML coding.
• You have helped an older family member with a computer problem or a problem with another electronic device.
• You like technology.
• You think tech careers involve sitting at a computer all day.

Action:
• Use the results of the "Thumbs up, Thumbs down" activity as a jumping-off point for discussion. The counsellor or teacher should engage students in a conversation about their familiarity with technology and perceptions of careers in this field.

• Have students discuss how their own knowledge and comfort level with technology may be different from that of older generations.
• This can lead to a discussion about the implications for the world of work, and can serve as an introduction to CareerMash.ca and the various tech careers profiled on the site.

Suggested discussion questions:
• What are some of the things that you do with technology that your parents or people their age don't?
• How might your TV watching habits be different from those of your parents' generation?
• How often do you find yourself teaching your parents something about technology?
• In what way is the world different for you than it was for your parents or grandparents when they were growing up because of technology?

Assessment As Learning: Think, Pair, Share
Have students form small groups to discuss these questions and take notes on chart paper.

Have them share their findings with another group before bringing it back to class for discussion and wrap-up.

Consolidate/Debrief:
• Use a video from CareerMash to bring closure to the discussion, such as the **How to Mash** video or the **Why Students Say YES to Tech!** video. The counsellor or teacher can ask students to reflect on how their own technological abilities can open doors for a variety of well paying, in-demand tech careers.

IPP Components: Who am I? Who do I want to become?

Differentiated Instruction:
• This activity could be altered so that rather than "Thumbs up, Thumbs Down" it could be "Stand up, Sit down" to incorporate more kinesthetic activity.

Assessment Strategy: Assessment For Learning (Thumbs Up, Thumbs Down activity), Assessment As Learning (Think, Pair, Share activity)

3) Chalkboard Splash

Learning Goals: Students discuss their own perspectives of tech-related jobs. They also learn a number of facts about the tech field and consider the information in terms of how it may affect their own career choices.

Success Criteria:
Students will:
• Learn about the demand for trained people in ICT and tech-related fields.
• Develop their communication, listening and interpersonal skills.

Minds On:
• Students are asked to discuss with a partner whether they have ever considered pursuing a career in the tech field. Why or why not?

Action:
• The teacher or counsellor post the Chalkboard Splash questions (listed at the end of this activity) on the walls around the room, using the board or chart paper, leaving ample room for students to respond underneath the question.
• Each student is given a marker or chalk. They walk around the room at their own pace, answering or commenting on the questions posted. They should not put their names next to their comments since this activity is meant to be more anonymous without students judging each other's comments.
• Students do not have to follow a particular order. They can move freely among the questions and comment more than once on any given question. Or, they may skip certain questions entirely.
• The teacher or counsellor should frequently announce the time remaining for this activity so students can budget their time accordingly.
• The teacher or counsellor should also circulate and interact with students as they write their comments.

Consolidate/Debrief:
• Together as a class, discuss the questions, answers and comments from around the room.
• The teacher or counsellor can include some of the facts about the tech field from the **CareerMash Statistics** page in order to give some context to the discussion.

Assessment For Learning: Visual Cloud
Ask students to reflect on today's learning and draw a visual representation of a tech career that they learned most about. It can be in picture or **wordle** format.

Educator Prompts:
• What did you learn about a tech career that surprised you most?
• Imagine what a typical day in the life of this tech career would look like?
• What skills might you need to learn to pursue this tech career?
Have students share their visual representations with a partner.

IPP Components: What are my opportunities? Who do I want to become?

Differentiated Instruction:
• This activity incorporates kinesthetic learning, as students will be moving around the room engaging with the content.
• Students are directing the learning in this exercise, which allows for the inclusion of more perspectives.
• The Chalkboard Splash activity allows students to manage their own time at each statement/question, engaging with them in any order they choose. This allows students to learn at their own pace.

Assessment Strategy: Assessment For Learning (Discussion after Chalkboard activity), Assessment For Learning (Visual Cloud activity)

Chalkboard Splash Questions
Adapted from: **The Star.com**, Published On Tue Feb 21 2012
Dana Flavelle, Business Reporter, From CareerMash.ca Blog, Feb. 28, 2012

1) In high school, everyone wants to go into business or become a doctor while most employers are looking for people with computer and engineering skills. Why the mismatch?
2) David Ticoll, special advisor to the Canadian Coalition for Tomorrow's ICT skills, said the problem is cultural, noting few parents, teachers or media are aware of the new IT professions. What do you think?
3) Few graduates have a combination of technical training, such as engineering and sales skills, which is another area of high demand. Why might this be a problem?
4) What kind of a career do you want to pursue?
5) Do you consider yourself to be tech-savvy, or to have the skills and knowledge to pursue a career in the tech field?

4) Here I Am

Learning Goals: Students gain an understanding of different types of tech careers and the main activities involved with working in the tech field.

Success criteria:
Students will:
• Be able to convey information about tech-related careers to their peers in a creative way.
• Complete a final product that all team members have taken part in creating and/or presenting.

Minds on:
• The teacher or counsellor introduces a hypothetical person who needs career information in order to make decisions about their life. But this person understands information best when it is presented in a creative way, rather than just through words alone. Students are asked to brainstorm different kinds of creative expression that could be used to communicate information to this hypothetical person. Examples might include art, music, drama or dance.
• The teacher or counsellor records the suggestions on the board and makes sure that students are on the right track in terms of what type of creative communication is desirable for this activity.

Action:
• Students are divided into groups of four.
• Teacher or counsellor has a predetermined list of Career Profiles.
• Each group is assigned a Career Profile
• Each group is to create a poster, dramatization, musical or dance representation of the Career Profile that they have been given. Students may also use another form of creative communication not mentioned here, if it is approved by the teacher or counsellor.

• Students are asked to include representations of non tech-specific dimensions of the profile, including both general business/leadership skills and subject matter skills.

Consolidation/Debrief:
• Groups present their work to the class and other groups offer their interpretations of what the career entails based on the presentations.

Assessment For Learning:
• Students are asked to write a personal reflection based on the careers presented and whether they would be personally interested in any of those fields.

IPP Components: What are my opportunities? Who do I want to become?

Differentiated Instruction:
• Students have a choice in how they present their assigned career to the class, including options that are more kinesthetic.
• Students listen to and view **Career Profiles** presentations in a variety of different formats from the other student groups, so their own learning style is more likely to be represented within the variety of presentation formats.
• After the group presentations, students have the opportunity to both hear what other students have learned and to have some time for quiet individual reflection.

Assessment Strategy: Assessment For Learning (Reflection Writing Activity)

5) Meet the Pros

Learning Goals: Students will learn that there are many different educational and professional paths that lead to a tech-related career.

Success Criteria:
Students will:
• Be introduced to the four CareerMash job families.
• Be introduced to the pathways taken by numerous tech pros.
• Develop their creativity, communication, listening and teamwork skills.

Minds On:
• Students are divided into groups of two or three.
• Students are asked to discuss the following question: "What do you think are the skills and knowledge required for working in a particular tech job? Do people need to attend college or university to get these skills, or are there tech jobs for those who want to go straight into the workplace?"
• In their groups, students will use CareerMash.ca to come up with a tech job for each of the different pathways.

Action:
• Each group is assigned a profile from the **Meet the Pros** section of CareerMash.ca, ensuring that all four job families and all four pathways are represented (see **CareerMash Career Types Comparison Table** for suggestions). See Meet the Pros pathways examples in **Appendix A.**
• Each group reads the information on the career type of their assigned tech pro. This can be done either on computers or from computer print-outs.
• Each group is to create a career/life map of their assigned person.

Assessment As Learning:
Have students evaluate a group presentation of their choice by answering the following questions for peer feedback.

Tech Profession of Group Presentation:

1. On a scale from 1-10 did this presentation communicate a clear pathway of their chosen tech professional?
2. Summarize in a few sentences how this tech professional got to where they are today.
3. What did you learn from this presentation that surprised or interested you? Explain.
4. Give a suggestion to how you feel this group could have improved upon their presentation.

Consolidate/Debrief:
Upon completion, each group posts their career map on the wall somewhere in the classroom. Each group presents their map to the entire group, and afterwards students get some time to do a Gallery Walk on their own to review the different maps at their own pace.

IPP Components: What are my opportunities? Who do I want to become? What are my plans to achieve?

Differentiated instruction:
• Students divided into groups use **Meet the Pros** on CareerMash.ca to create career maps in a variety of formats, which are then posted around the classroom to form a "gallery." Students read the profiles from the website and create a visual aid (such as a mind map, a character chart, or any other graphic organizer) to present a map of the route the tech professional followed to his or her current career position. The lesson also includes listening to other groups present their maps and moving around the room during the Gallery Walk activity.
• If computer access is available to students, many **Meet the Pros** profiles have videos embedded, allowing for even more variety in how the knowledge is presented.
• Student groups use creativity to design how their career map will look.
• The Gallery Walk allows students to control the amount of time they spend with each career map, allowing them to learn more about careers that interest them the most or focus on learning about careers they previously didn't know about.

Assessment Strategy: Assessment As Learning (Group Presentation, Peer Feedback Questionnaire)

6) Who Am I?

Learning Goals: Students discover the CareerMash job family best suited to them personally.

Success Criteria:
Students will:
• Explore the four CareerMash job families in detail.
• Identify the career type that best suits their personality and working style.
• Explore how they might transition from one job family to another over the course of a career.
• Discuss their initial job family with their peers.
• Be introduced to the ways all job families can mash up tech with their talents, personal interests and passions.

Minds On:
• Introduce students to CareerMash's four career types by reading aloud the descriptions of each type from the table on page 15 – **CareerMash Career Job Families Comparison Table.**
• Hand out copies of the **CareerMash Career Job Families Comparison Table** to students so they can read the descriptions of each job family.
• Students choose which of the four job families best suits their personality and work approach. Once they have selected a job family, each family forms a group in the four corners of the classroom to meet with others in their type. (For example, Leaders in one corner, Builders in another, and so on).

Action:
• In their groups, have students discuss the following:
  - Why do you think you are best suited to this job family?
  - What strengths do you think this job family brings to a team on the job?
  - Come up with two statements that will help other job families understand you better. For example: "The main skills in this job family are…"

  - Describe how you might change from one job family to another over the course of your career.
  - Discuss how some real life jobs would combine aspects of more than one job family.

Consolidate/Debrief:
• Have students return to their seats. Engage the whole class in a discussion about the activity and the four career types.

Assessment For/As Learning:
As a class or in small groups, have students discuss the following questions:
• Why do you think we did this activity today? Why might it be important for us to think about the different job families and styles of work?
• Did you find it difficult to decide the job family best suited for you?
• How can these job family profiles help us work together better as a class and as a team?
• Have students examine the "Your Passion + Tech = Dream Career" on **page 25.** Explain that regardless of the career type, there are tech jobs in virtually every field of interest.

IPP Components: Who am I? Who do I want to become?

Differentiated Instruction:
• Students both hear and read the descriptions of each CareerMash tech job family type.
• Students are introduced to a visual representation of how tech can mash up with their personal interests.

Assessment Strategy: Assessment For/As Learning (Class/Group Debrief Discussion)

7) CareerMash Mash

Learning Goals: Students will learn from CareerMash.ca and from each other, the many different ways that a technology-related career can mash up with their personal interests.

Success Criteria:
Students will:
• Develop a deeper understanding of the concept of how individual interests mash up with tech-related jobs.
• Create their own tech career mash up.
• Develop their communication, interpersonal, and creative skills.

Minds On:
• Divide students into groups of four.
• Using a placemat exercise, each group will decide on a **Career Profile** from CareerMash.ca to explore in more depth. First, each individual student will brainstorm a short list of two to three **Career Profiles** that they are interested in. Once each student has done this in their own quadrant, they will decide as a group on the top two or three profiles to explore together and list these selections in the centre of the placemat.
• Students will choose one Career Profile and write it on the board. Groups cannot choose the same Career Profile and therefore the first groups to complete their choices get the first opportunity to write their selection on the board. If another group's first choice is spoken for, they will go on to the next one on their list.

Action:
• Each group will be given a coloured marker and a piece of chart paper. At the top of their paper they will write the name of the Career Profile they agreed upon during the placemat activity.
• Students will read about their Career Profile from the CareerMash website or on handouts.
• Students are to brainstorm how other talents or interests could be applied within that tech occupation. For example: Career Profile – Programmer. Interest – Art. Application: game developers use their coding skills to create beautiful games for next generation Phones, tablets and gaming consoles.

• After a sufficient period of time, the chart paper is to be moved clockwise to a new group. With the new chart sheet, each group is to look at the previous group's ideas and then continue brainstorming with their own coloured marker. The process is to continue until each group gets their original chart paper back.

Consolidate/Debrief:
• All chart papers are to be posted around the room and groups are to do a Gallery Walk to see all the contributions. Should they have additional ideas as a result of viewing the chart papers, they can add them to the paper using their coloured marker.
• Optional: students could vote, using coloured stickers, for their top 1, 2, or 3 job choices.

Assessment For/As Learning: Career Pitch
Have students select one of the career profiles highlighted in today's class and imagine themself in this career. They are to write a short pitch to why they're a great fit for this career and share their pitch with a partner for feedback.

1. Did your partner communicate a convincing career pitch? What made it convincing or not convincing?

IPP Components: Who do I want to become? What are my opportunities?

Differentiated Instruction:
• The placemat activity allows students to explore their own interests while also working collaboratively with a group to come up with answers.
• Using chart paper and markers allows information to be colour-coded for easy viewing.
• While this activity starts with students gaining knowledge from CareerMash.ca, the bulk of their learning will be student-directed. As the activity progresses and students see what others have written, their thinking about a particular Career Profile may shift.
• This activity incorporates visual learning as well as kinesthetic activity.

Assessment Strategy: Assessment For/As Learning (Career Pitch exercise)

Note: The Placemat Activity allows students in a group to individually brainstorm ideas and responses to a question. The individual responses are then shared with the group. After discussion, the group agrees upon one or more responses for the centre of the placemat. More info and visuals of placemat templates are available in the "Oral Strategies" section of the Ministry of Education's Think Literacy Cross-Curricular Approaches guide, available here.

8) College & University Pathways

Learning Goals: Students identify some of their personal interests and use the **After High School** section on CareerMash.ca to find post-secondary programs that mash up tech with their individual interests.

Success Criteria:
Students will:
• Understand that tech-related careers are diverse, with desirable pathways for students with any interest.
• Identify at least two tech-related post-secondary programs that mash up technology with their personal interests or passions.
• Develop the creative inquiry and research skills needed to navigate CareerMash.ca and other online resources to identify the post-secondary programs best suited to their interests.

Minds On:
• Students are to brainstorm at least two or three of their personal interests with emphasis on those they might like to include as part of their career. Students should focus on what they enjoy doing, not whether they think it is a viable career option. For example, if they enjoy art, they should include it on the list, even if they have never considered being an artist for a living.
• If students are having a hard time coming up with interests, the teacher or counsellor may talk to them about what they like to do in their free time to help them develop ideas. If they have already completed the (Assessment For Learning) **Mashup Scavenger Hunt** activity, they should already have a list of some of their interests.

Action:
• Students visit the CareerMash.ca homepage, and navigate to the **After High School** section as well as the **Find Your Career Mashup** section under **Careers**. Here, students will find a long list of post-secondary tech programs as well as popular personal interests mashed up with tech such as art, sports, music, fashion and healthcare. Using the keyword search specific to the **After High School** page (not the search for the entire CareerMash site), students input one of their interests and see what post-secondary programs result from that search.
• Students will read through their search results and will make a note of one or two programs that appeal to them for each of their interests.
• Students may want to discuss those programs and schools with their guidance counsellor to find out more about the admissions requirements and other details about the school.

Consolidate/Debrief:
Assessment For Learning, Exit Card Activity

• Using the template provided in **Appendix B,** students complete the 3-2-1 exit card activity, where they can consolidate the information they've learned in the day's activity.
• The teacher or counsellor ensures that each student has completed the 3-2-1 activity, but does not need to collect them.

IPP Components: Who do I want to become? What are my plans to achieve?

Differentiated Instruction:
• Students have a choice with this exercise, namely what areas of interest they decide to research and how they prioritize their interests.
• The **After High School** section of CareerMash. ca provides information both in written format and through audio-visual resources, allowing students to absorb information through a variety of formats.

Assessment Strategy: Assessment For Learning (Minds On, Mashup Scavenger Hunt, Exit Pass)

9) Gender and Tech

Learning Goals: Students learn about the gender imbalance in the tech field and discuss their opinions and thoughts on this subject as they relate their personal thoughts and experiences to different articles on the topic.

Success Criteria:
Students will:
- Develop their communication, interpersonal and active listening skills.
- Learn more about the gender imbalance in the tech field.
- Develop their focused reading skills.

Minds On:
- The teacher or counsellor introduces the topic of the day, which is girls and women in tech. The topic is controversial so the educator may want to set some ground rules for discussion in order to ensure that students treat each other with respect throughout the activity.
- The teacher or counsellor asks students: "Do you think there is a gender imbalance in the tech field?" followed by a short discussion of this question.
- Facts to foster discussion: while 46.7% of the Canadian workforce are women, they account for only 24% of all ICT occupations. The proportion of women in IT has not changed in over 10 years.
- The students are divided into groups of four or five.
- The educator distributes handouts of articles and blogs to each group and explains the First Turn/Last Turn activity (See below). Each group will be reading a set of articles and blog posts about women in the tech field with each individual in the group receiving their own copies. (see **Appendix C** for a list of appropriate blog posts to use for this activity).

Action:
- Students quietly read their articles in their respective groups before highlighting two to three points that they find significant.
- Students complete the First Turn/Last Turn activity as instructed.

Assessment For Learning: Tweet to Action
Summing up their learning, have students compose a tweet (140 characters or less) that acts as a call to action for more women in ICT careers.

*Modification - If students don't have a twitter account they can create a similar post for any one of their social media accounts or compose their tweet on chart paper.

IPP Components: Who am I? Who do I want to become?

Differentiated Instruction:
- Students each have a chance to speak in the group with others remaining silent. This arrangement is especially useful for students who may be too shy to speak up in front of the entire class.
- Using highlighters to isolate important points in the blog posts or articles helps students to visualize the information and remember certain points more easily.
- This activity involves whole class discussion after small group work is completed.

Assessment Strategy: Assessment For Learning (Tweet to Action exercise)

First Turn/Last Turn Activity*

This activity is useful for fostering active listening skills and focused discussion among students. Instructions for students:

1. Read Individually. Highlight 2-3 sentences or points that stand out to you.
2. When it is your turn, read aloud one of your highlighted items. Do not comment on it, simply read it aloud.
3. Moving clockwise, each group member will comment about the item – each student takes their turn, but there is no cross-talk. If you want to respond to something that another student has said, you must wait your turn to speak.
4. The person who initially shared the item then shares their thinking about what stood out to them.
5. Repeat the pattern with the next student and next item. If another student uses one of your items, you must choose a different one.

* *(adapted from "Data Driven Dialogue: A Facilitator's Guide to Collaborative Inquiry" by Bruce Wellman and Laura Lipton, 2004, p. 138)*

10) CareerMash Review Jeopardy

Learning Goals: Students review all of the information they have learned about the tech field from previous CareerMash activities.

Success Criteria:
Students will:
- Develop their review and question-writing skills.
- Review a wide variety of CareerMash content and facts.
- Develop their communication and interpersonal skills.

Minds On:
- Students are placed into four to five groups. Each group is assigned one content section from CareerMash.ca that they have learned about through previous lessons such as **After High School**, **Four Career Types**, **Career Profiles**, **Meet the Pros** and **Career Mashups.**
- Within their group, students decide together who will be responsible for each monetary value - $100, $200, and so on – like the values in the game show Jeopardy.
- Once they have their assigned monetary value, students create a question based on the information they have learned from a section of CareerMash.ca. The lower the monetary value, the easier the question should be. When they have decided on a question, they consult with others in their group to ensure that there are no duplicate questions.
- Each student uses a piece of construction paper and puts their question on one side and the monetary value on the other before posting it on the wall under their group's section heading. They should give a complete list of their group's questions and answers to the teacher.

Action:
- Students are redistributed from their groups into teams for the game of CareerMash Review Jeopardy, ensuring that each team only has one member from any one group so no team has an unfair advantage in knowing more answers in any given category.
- The teams play CareerMash Review Jeopardy, selecting question cards under the $ amount until all the questions are used. While competition will drive the game, the ultimate goal is for students to review what they have learned from CareerMash about tech careers.

Consolidate/Debrief: (Assessment For Learning)
- The teacher or counsellor uses an exit card to assess whether students have lingering questions about the tech sector and tech careers. Questions may include: "Are there any questions that remain unanswered for you about careers in tech?" or, "What else do you want to learn about the tech field that we have not yet covered?"
- Students answer exit cards anonymously on a sheet of paper and submit it to the teacher or counsellor who review the input to adapt future lessons and activities according to students' needs.

IPP Components: Who do I want to become? What are my plans to achieve?

Differentiated Instruction:
- Review activity in the form of a Jeopardy game is student-directed learning. The students create the review questions and answers from what they have learned about tech careers from previous CareerMash lesson activities.
- All students participate in the Jeopardy game, including students who are not comfortable answering questions out loud in class.
- This activity is great for aural learners since the game involves reading questions out loud to the class.

Assessment Strategy: Assessment For Learning (Jeopardy Game, Exit Card)

CareerMash and Experiential Learning

Work experience and cooperative education give students opportunities to combine academic studies with real world experience. Marketing the value of co-op and experiential learning opportunities is vital.

About Experiential Learning

A student's career education is developed and enhanced through participation in a variety of programs and courses. In Ontario, these include the grade 10 Career Studies course, the requirement of 40 hours of community service and the career education component of their selected courses.

Cooperative education and other forms of experiential learning are an important part of the career education component. These include work experience, job shadowing, job twinning and specialized programs such as the Ontario Youth Apprenticeship Program and school-work programs.

The primary purpose of this section of the Kit is to expose guidance counsellors to the creative options available to students in the ICT and tech field and to encourage all students to 'think outside the box' as they contemplate their future careers.

CareerMash and Cooperative Education

Work experience and cooperative education give students opportunities to combine academic studies with real world experience. Marketing the value of co-op and experiential learning opportunities is vital.

Introducing the CareerMash.ca website at the grade 9 level makes the career discovery process fun. Not only does the website support students' career exploration, it also provides them with ample evidence to support the specific importance of co-op programs in paving a career path. A simple search for the word "co-op" on

CareerMash.ca's search engine yields numerous pages of results.

Once the students have an opportunity to explore the site, direct them to the **Meet the Pros** section. Many of the pros profiled on CareerMash.ca have positive things to say about their experiences as a co-op student and how it helped shape their career paths in technology.

Check out **Robert Holt**, who had two co-op placements at Canadian Tire. **Marcos Diclei Barros**, a manager at American Express, gives some pointers for students about co-op and internship placements. Under "Tips for success" he talks about the importance of finding your tech mashup and the rewards of helping others.

Sometimes a co-op experience can lead to a more permanent job. **Satish Kanwar,** co-founder of Jet Cooper (acquired by Shopify), is an advocate for job shadowing, internships and cooperative education.

Inform students about experiential learning opportunities:

- As early as grade 9, use **option selection time** to discuss options 2 and 3 of the Ontario Secondary School Diploma Requirements with students. These options include taking a business credit, a cooperative education credit, a technological education credit or a computer studies credit. Talk with students about how much technology is a part of their everyday life and the importance of a well-rounded education that includes tech skills.
- At **parent information evenings** and individual family appointments, explain the experiential learning options to families and discuss how these options might fit into the student's destination planning. The **CareerMash** website – particularly **In the Blog**, **Meet the Pros**, **Career Profiles** and **Career Mashup** sections – can be very useful in educating parents about the changing job market and the importance of tech knowledge and skills for today's students. Parents and families play a major role in determining a child's future so it is important to ensure they are informed about the changing world of work which has technology as its basic foundation.
- Book a **meeting with the co-op teacher** at course selection time to introduce the teacher to CareerMash.ca. As the co-op teacher promotes co-op to students through classroom visits, assemblies, and information sessions, they can highlight CareerMash.ca and encourage students to check it out as they consider their placement.
- During the pre-placement phase of the co-op course, **book a visit in a computer lab** with the co-op class to talk about CareerMash.ca in more detail or to run one of the student activities in this resource package.

Secondary School and Experiential Learning

The "Take Your Kids to Work" option offered to grade nine students is a great program, and a great time to begin the career search process with students. **The Learning Partnership** is a useful resource that helps to prepare for this event. The CareerMash.ca **Workplaces** section has a great list of employers who hire graduates with ICT and tech-related skills.

Job shadowing or field trips to companies are examples of other opportunities for students to learn about different types of tech careers. They can be integrated into any credit course and are a valuable experience for all students and all Pathways. To set up a supervised job shadowing session, check out CareerMash.ca for some major employers who support students and experiential learning. **American Express Canada, Canadian Tire Corporation**, **Deloitte**, **Manulife Financial, Royal Bank of Canada, Scotiabank**, and **Xerox Canada** are just some of the workplaces that support and encourage student involvement.

Teachers and students may have parents, family or friends that work at major companies whom they can ask about job shadowing. If not, the Human Resources department at any company is generally the first point of contact for job shadowing opportunities, and the company's website should list the contact information for this department.

For job shadowing sessions, Field Trip Permission forms need to be signed and some employers may request a Work Education Agreement.

- Prior to the visit, **create activities** that will help prepare the student for the experience. Even workplace basics such as making introductions, shaking hands, asking questions, maintaining workplace safety and practicing proper etiquette may be new to many students.
- Prepare an **assignment** for students to complete during the field trip day that will encourage reflection and productive discussions after the experience.
- Ensure that the workplace supervisor is **informed** about the interests and abilities of the participating student well before the day of the job shadowing session to help maximize the experience for everyone involved.

Post-Secondary Experiential Learning

CareerMash.ca has many useful tools and a wealth of information for guidance counsellors who are helping students navigate the many post-secondary tech-related programs with co-op options. CareerMash's **After High School** section profiles a number of post-secondary programs that are tech focused, many of which include experiential learning components.

Many students today pursue a varied route towards their career of choice, combining university, college and work experiences to achieve their goals. Many post-secondary institutions are addressing this trend by adapting their programs and forming partnerships with workplaces and other schools to address current and future workplace needs.

One such partnership is between The University of Toronto Mississauga and Sheridan College, who together offer the **Communication, Culture, and Information Technology** (CCIT) program. In this program, students have the opportunity to choose from various specializations and complete courses in both university and college environments to provide a wider variety of learning experiences.

Multimedia Design is another post-secondary program option that offers a variety of experiential learning components. The program, offered at Durham College, includes a field placement in the final year of the program. Students more interested in a joint college and university program could pursue **Bachelor of Information Technology/Interactive Multimedia & Design** program offered through Carleton University and Algonquin College in Ottawa.

Many students today pursue a varied route towards their career of choice, combining university, college and work experiences to achieve their goals.

For those students who are more business-inclined, the new **Business Technology Management (BTM)** program is a great post-secondary option that combines business and technology courses. Employers need people who understand how to harness technology to meet the changing needs of our fast-paced world. As well, tech innovators need business skills to ensure their great ideas succeed in the marketplace.

This is what BTM is all about. This new degree is offered at several universities and colleges, nearly all of which ensure that students obtain the co-op experiences, internships and other real workplace skills that they need to land top jobs. BTM programs also include an integrative final year project where students tackle a real challenge faced by an organization. The following graduates of BTM programs highlight what the program has done for them.

- **Akshay Kochar** works for Agility Inc., a web firm that provides simple content management systems to companies like Doritos and the Oprah Winfrey Network. Akshay landed a job as a project coordinator the day after he graduated!
- **Chrislyn Tziortzis** develops media including websites, videos and graphics for the Government of Ontario to help the government communicate to the public as effectively and creatively as possible.
- **Khaled Al-Qinneh** of RBC is an IT project manager who leads hybrid business-technology project teams to create and improve banking products like online banking apps for smartphone users.

See **Appendix D** for some helpful tips for students who are going into a co-op placement.

Mentoring Relationships

About Mentorship

A mentor supports high school students in a way that helps them to be more effective in developing their personal career plans. They help identify students' personal strengths and talent as well as high school and post-secondary courses that can help them meet their objectives.

Mentorship is a relationship based on trust, designed to build confidence and to encourage the student (the mentee) to take initiative in their career development. Mentoring relationships should honour what is special and unique about each individual and foster positive feedback and honest dialogue.

What is a mentor relationship?

• An equitable commitment and investment from both partners.
• An informal alliance.
• An opportunity to gain insight.
• A network builder.

Introducing students to the concept of mentorship at the high school level will lay the foundation for them to cultivate such relationships throughout their life. Teachers,

coaches, guidance counsellors, student council members and peer tutors can all help students to build social, emotional, academic and practical skills. Experiential learning in high school may lead to long-lasting mentoring relationships for students. The key component for a successful mentorship is to find the right fit and to tailor the relationship to meet the needs of the student.

Many of the individuals profiled in CareerMash's **Meet the Pros** section speak very highly of mentorships and of the priceless learning opportunities that these relationships can provide.

CareerMash Online Mentoring Program

Finding the right mentor can be a challenge for young people, especially when they lack access to potential role models for tech careers. That's exactly why CareerMash launched a new Online Mentoring Program for high school students. The **Mentoring with CareerMash** program gives students the opportunity to connect directly with mentors through a safe and monitored online community. The mentors are tech professionals who work in a variety of workplaces and who have followed many different pathways to arrive at their current careers. Some mentors are current post-secondary students, who will be able to speak about their experiences in ICT and tech-related programs after high school.

The Mentoring with CareerMash program provides students with direct access to people working on the cutting-edge of a rapidly changing tech-related field. The program supports ambitious and forward-thinking students as they inform themselves about their opportunities in one of Canada's most in-demand employment sectors. To find out more about this program, or to enroll your students in the program, contact the **Managing Director** at CareerMash.

CareerMash Role Model Program

What better way to learn about tech careers than straight from an industry insider? Every semester, the CareerMash **Role Model Program** brings technology professionals from a wide range of fields into high school classrooms to share their career stories with teenagers.

CareerMash offers a diverse roster of Role Models in the Greater Toronto Area and across southern Ontario. Role model careers range from bioinformatics researchers to mobile app developers. These presentations are not just for tech-savvy students. The 8,000+ students reached each year include Career Studies, English, Fine Art, and Business classes.

Check out CareerMash.ca to learn more about the Role Model program. To request a Role Model for your school, contact the **Program Manager.**

Here's what one Role Model had to say about their CareerMash experience: *"It was great! I really enjoyed it and received some good feedback from the students. Some that were considering engineering were asking me questions in private at the end. The other two panelists were fantastic as well and we had a great time – we meshed very well. The school staff was fantastic! The teachers were great - very cool, fun to work with and the kids have obvious respect towards them. This is definitely different from what I remember when I went to high school! I told my wife that I hope the high schools where we live will be just as good."*

" The presentation was informative! I didn't know that so many jobs required technology, and it is so easy to connect what you like to do with technology."

— Grade 10 Student

Appendix A

Meet the Pros Career Pathways

Here is a short list of CareerMash.ca tech Pros for educators who want to ensure they have a cross-section of Pathways represented when engaging students in learning activities. Many of the Pros have followed a variety of Pathways to reach their current careers – these are just some examples of Pros and their primary Pathways.

University	College	Workplace	Did not initially study tech
April Blaylock *Robotics Engineer at Aeryon Labs* **Education:** • Studied Mechanical Engineering with a Mechatronics co-op at the University of Waterloo. • Obtained a Masters in Mechanical and Mechatronic Engineering. **Type:** Innovator, Builder	**Brett Sverkas** *Mechanical Engineer at Earth Rangers* **Education:** • Brett studied Mechanical Engineering at Centennial College and then obtained a diploma in Building Systems Engineering from Seneca College. **Type:** Builders	**Rob Di Stefano** *IT Director at Earth Rangers* **Education:** • Studied Computer Science while in high school. • Went straight into the workplace but took technical training courses online to earn various certificates. **Type:** Leader	**Ryan Philips** *Business Analyst at Bell Canada* **Education:** • Has a degree in economics and urban planning from Concordia University. • After graduating, he was offered a management position at the Bell call centre. **Type:** Leader
Natalie Silvanovich *Security Researcher (aka Professional Hacker) at Blackberry* **Education:** • Studied Electrical Engineering at the University of British Columbia. • Did numerous co-op placements before being hired at Blackberry. **Type:** Innovator	**Tack Chen** *Network Administrator, Randstad Canada* **Education:** • Tack studied Network and System Administration at Centennial College. • Did two co-op placements at Randstad while at school – got hired full-time after graduation. **Type:** Support Professional		**Andrea Arbour** *Graphic Designer at Innovatia Inc.* **Education:** • Originally attended the Architecture program at the University of Manitoba but switched to a Bachelor of Design degree from the Nova Scotia College of Art and Design. **Type:** Builder

Meet the Pros Career Pathways

University	College	Workplace	Did not initially study tech
Akshay Kochar *Project Manager at Agility Inc.* **Education:** • Started by studying Accounting at the University of Toronto but switched his major to Digital Enterprise Management. **Type:** Leader, Support Professional	**Jason Anderson** *Technical Specialist at Canadian Tire Corporation* **Education:** • Computer Science and Network Technology at Centennial College. • Completed two co-op placements at Canadian Tire during his time in college. **Type:** Support Professional	**Aaron Berquist** *IT Team Leader at Open Text* **Education:** • Studied Commerce at McMaster University but decided it wasn't for him. • Took Software Engineering at Mohawk College for one year. • Worked as a telemarketer but got hired in the IT department and left school. **Type:** Leader, Builder	**Noah Kenneally & Alison Gaston,** *Researchers at the Experiental Design and Gaming (EDGE) lab in the Digital Media Zone at Ryerson University* **Education:** • Alison has a BA in Psychology and Early Childhood Education (ECE) and is pursuing her MA in ECE. • Noah is currently working towards his BA in ECE. • Noah and Alison develop learning technologies that make it easier for children with disabilities to do schoolwork and build relationships with their friends. **Type:** Innovators
Farhan Thawar *Vice President of Engineering at Pivotal Labs* **Education:** • Bachelors' of Computer Science and Electrical Engineering from the University of Waterloo. • Master's of Business Administration (MBA) in financial engineering from the University of Toronto. **Type:** Leader, Innovator	**Maggie Thornton** *National Alliance Manager at Dell Canada* **Education:** • Studied Marketing at Seneca College. **Type:** Leader		**Chris Barless** *Web Developer at Pilot Interactive* **Education:** • Started out in Geology at the University of Toronto. • Switched to Radio and Television Arts at Ryerson University. • Taught himself programming while working at various jobs he didn't like. **Type:** Builder

Appendix B

3-2-1 Exit Card

3 things I learned today:

2 questions I still have:

1 thing I liked about today's activity:

Appendix C

Resources for "Gender and Tech" Activity

1) **"Helping Computer Science Gain STEAM With Girls"**

2) **"Code secrets: The real reasons why girls need to become computer geeks"**

3) **"Fabulous Canadian women taking the tech industry by storm"**

4) **"Meet five dynamic Microsoft women inspiring change in technology"**

5) **"Why the Engineering, Computer Science Gender Gap Persists"**

6) **"Girls can change the world with technology"**

7) **"Girls visit tech companies to explore career possibilities"**

8) **"Myth: Girls and tech careers don't mix"**

9) **"Continued lack of women in tech bemoaned by ex-techie lady MP"**

10) **"Natalie Panek, Space Missions Engineer, on Inspiring Gen Y Women into Tech"**

11) **"Women conspicuously absent from tech industries"**

12) **"Alicia Keys and Blackberry Scholars Program aim to fire up girls' interest in tech careers"**

13) **"Meet the Millennial Women Who Could Shake Up Computer Science Forever"**

14) **"Girl Scouts Introduce the Video Game Developer Badge"**

Appendix D

How to Make the Most of a Tech Co-op Placement

Tips for Students:

• **On the first day of your placement, ask your co-op supervisor to introduce you to the rest of the people in your work area.** Tell them how pleased you are to be a part of the team and that you want to learn every aspect of the job. Let them know that you'd love to learn a little bit about what they do at some point when they are not too busy. This personal and proactive approach wins friends and builds good will.

• **Early in the placement, find out which technologies (systems, application, databases) are critical to the work of the department.** Share your skill set and comfort level with those technologies. If appropriate to your skill level, ask if the database needs cleaning up or offer to prepare an analysis of the user experiences of an application or website developed in-house.

• **It may take a while to find your niche in the organization and establish a routine.** Your teacher and supervisor will establish your personal placement learning plan (PPLP), but in the meantime, extend an offer to perform clerical or other support as needed. This work often provides useful insights for learning more about the department and organization.

• **Be proactive and make connections.** If clerical help is not needed, offer to fetch coffee a few times or ask about the topics you can research to find out more about this career field. By extending yourself in some way, it can bring you closer to your team and hopefully they will chat and give you insight into what is important and how things work.

• **Make the most out of your relationship with your supervisor.** Ask for help if you are unsure how to proceed. If you tend to be shy in the beginning, or your supervisor is always "too busy," ask your co-op teacher for support in this area. During your first evaluation meeting, explain that you want to be productive as quickly as possible and make clear that some support at the beginning of your placement would be very helpful.

• **Project a positive image.** Being friendly and courteous really counts in a placement. Your attire should reflect the office environment and when in doubt, ask. Remember, they are giving their time and expertise to help you with your education and career so projecting a positive, consistent image makes everyone feel more comfortable.

• **Take time to research both the organization and the career area.** This can be useful both for winning points with your supervisor and for doing well on school assignments. Make notes with links to articles and add new information as it comes your way.

Tips for Students (continued):

- **Be creative and think outside the box.** Remember, you bring a fresh perspective to the workplace. Regard any mistakes as learning opportunities. Open communication and dealing with events as they happen makes for less stress. Use your log sheets and weekly reflections to keep your teacher updated on your progress and solicit support when you need it. Your logs will also keep your work supervisor informed of your progress and any ideas or concerns you may have. This kind of reporting builds your lines of communication so you will be able to have meaningful discussions with your supervisor and demonstrate that you are engaged.

- **It's about work environment exposure, not just skills development.** If you are working for a tech company, and very few of the tasks you are given are tech-related, remember that often people who work in technology spend only part of their day in front of the computer. This is why all careers are a mashup of a variety of skills. Communicating with your boss and co-workers, organizing files or doing a spreadsheet will help you to understand what a tech career is like from the inside.
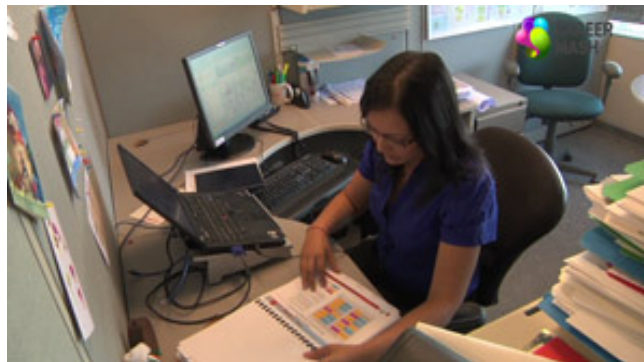
- **Think about what you would do if this were your job.** How would you improve a service or make a task easier or faster? Are you meeting the needs of the customer, student or client you are serving? While at your placement, it is important to think like you are part of the team.

- **Make the most of your evaluations.** What does your supervisor see as your greatest assets? Are you a builder, leader, support professional or innovator? How can your work habits be improved? Are you going the extra mile, lending support when needed? Are you networking? Every experience counts. You never know when you might need to call on your supervisor as a reference.

" *While you're still in school, you have the perfect chance to take initiatives outside of class and find what you really like doing.*"

Michele Romanow, Co-founder, Buytopia

ITAC talent
formerly CCICT

CAREER MASH
Inspiring Tech Careers

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