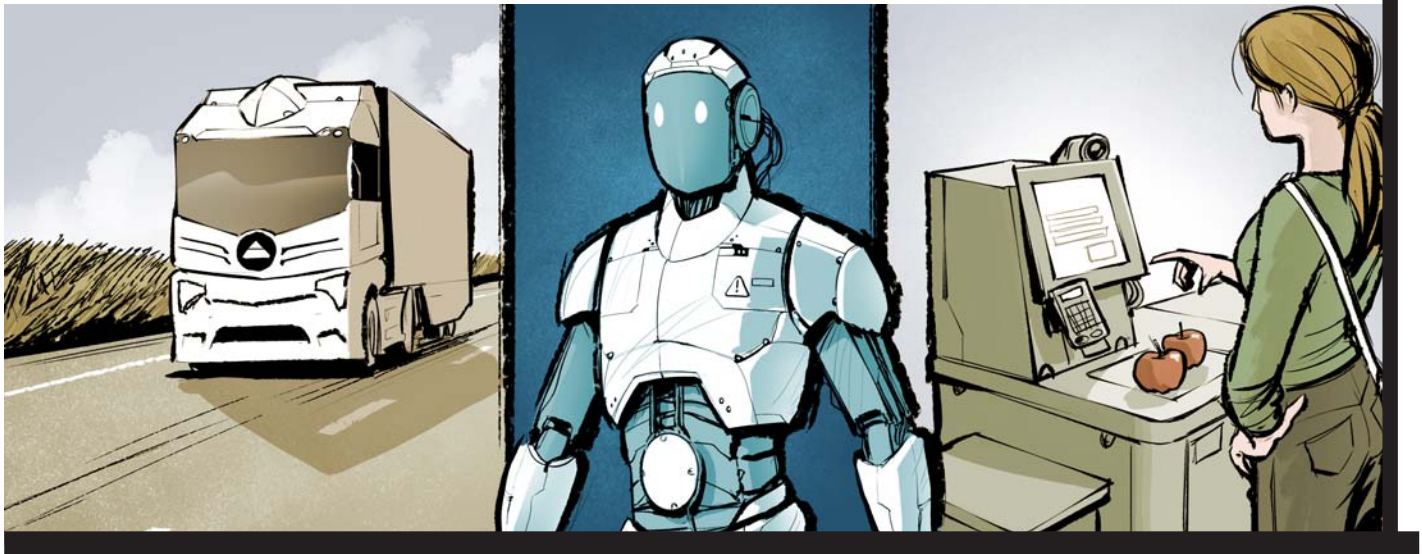




# WILL ROBOTS TAKE OVER OUR JOBS?



Two hundred years ago, lamp lighters performed a vital service for people living in London, England. They would go out each evening to light the lamps that lit up the dark streets. They'd be out again at dawn to extinguish the lamps. Of course, lamp lighters are now a thing of the past. That job disappeared with the invention of electricity and automatic timers.

Technological change is a part of life. Human inventions such as the wheel, the printing press, the steam engine and the Internet have re-shaped society. They've changed the nature of work and the skills that are required.

The Industrial Revolution of the late 1700s and early 1800s caused huge disruption in the labour force. Manual labour on farms and in homes was replaced by mechanized factories and the mass production of goods. That brought about an improved standard of living for some, but grim working and living conditions were the realities for many.

Now we're on the cusp of another revolution. Breakthroughs in artificial intelligence and advanced robotics are having an impact on jobs in almost every field. Smart machines can now perform many tasks more **efficiently** than people.

What does this mean for the jobs of the future? Where will they be? What skills will be needed?

"It's something Canadians are going to have to get their heads around," says Sean Mullin. He's the executive director of the Brookfield Institute for Innovation and **Entrepreneurship** at Toronto's Ryerson University. The Institute recently released a report painting a dramatic picture of possible future job losses due to automation.

It's certainly something students should keep in mind as they plan their future careers. What's the best way to 'future proof' your career in this changing economy?

## **JOBS AT RISK**

The Brookfield report predicts that nearly 42 percent of Canada's labour

force – some 12 million workers – is at high risk of automation in the next ten to twenty years.

"Even if a portion of that came to be true, that would be a huge disruption to Canada's work force over a really short period of time," says Mr. Mullin.

Reports from the U.S. and Britain provide similar predictions.

To get a sense of the kind of jobs that robots will be doing, just take a look at what's already happening around you.

Companies are experimenting with self-driving vehicles. The French city of Lyon, for example, has just rolled out a new driverless minibus service. Many stores have self-serve checkouts. Several companies are introducing drone delivery of fast food. And at more than half of all McDonald's restaurants, customers now use touch screens to place their orders.

If you need information, there's a virtual assistant in your digital device ready to look up answers on the Internet. It provides driving directions and tells you what's on your calendar

## **DEFINITIONS**

**EFFICIENT:** acting or producing effectively with a minimum of waste, expense, or unnecessary effort

**ENTREPRENEUR:** one who organizes, manages, and assumes the risks of a business or enterprise



for that day. There are even financial robo-advisors to help people decide where to invest their money.

Analysts say the jobs most at risk of automation are those in transportation, customer service and consumer services. That includes truck drivers, cashiers, sales clerks, food-counter attendants and kitchen helpers. Administrative assistants are also on the list, as computers take over routine office tasks such as scheduling and basic accounting.

### **JOBS NOT AT RISK**

If you're thinking about your future, you'll want to avoid occupations where computers are replacing humans. So, think of what humans do better than machines. We have an advantage when it comes to tasks requiring human **empathy** and social skills, for example. Computers are just not as good when it comes to connecting with other humans, listening, caring and being an effective communicator.

"Emotional well-being and people-to-people oriented interactions" are top among the skills we should be developing, according to author and commentator John Havens.

Jobs that highlight these people skills include nursing, teaching, and counseling. Problem-solving skills and good judgement are also critical skills that extend to management and other leadership positions.

There will likely be a growth of jobs in science, technology, engineering and math (the so-called STEM subjects). There will be a demand for people with analytical skills such as logic and critical thinking. We will need creative people. We will need global citizens who understand cultures and how

to collaborate with people wherever they may be. Writing skills and the ability to ask the right questions are becoming even more important.

No matter what the job, from education to medicine to the financial sector, digital skills will be essential. People will need to gain experience in working with smart machines and learn how to make use of their capabilities.

"A high degree of comfort combining digital tools with strong social skills will be critical to future proofing your career," says Saadia Zahidi of the World Economic Forum.

### **MANAGING THE CHANGE**

Not everyone expects this new revolution to result in massive job losses. "It's inarguable that as technology develops, it will automate certain tasks," says British IT expert Rick Robinson. "But 'tasks' are very different to 'jobs.'"

While some jobs will be lost, or at least re-shaped, automation might also create new opportunities. We might think about work in a new way. We can leave the machines to do tasks they do better and more accurately than humans, while workers double down on the human strengths that are vital to the job.

Still, the Brookfield report says society should prepare for what's coming.

"We don't want to have a situation where... 42 percent of the workforce is out of a job," says Mr. Mullin. We should be thinking about government safety nets, or retraining programs to help people whose jobs are automated.

We'll need to invest more in education and skills training, and shift the focus

### **UNIVERSAL BASIC INCOME – A SAFETY NET?**

How can we support people who may lose their jobs due to technological advances? Some people have suggested bringing in a universal basic income. That would see the government providing everyone, working or not, with enough money to maintain a decent standard of living. Those with paid jobs would earn additional income, but those displaced by technology would not be driven to poverty.

A universal basic income is an idea that several countries are experimenting with. Ontario plans to roll out a pilot program next year.

of these educational institutions to better prepare students for the new jobs of the future. Jobs most at risk of automation are typically done by people with less education. This includes low-skill and entry-level jobs often performed by youth, from delivering pizzas to working in retail. People working in occupations that are at low risk of automation are three times as likely to have a post-secondary degree.

Experts also say that whatever job you train for today, don't expect to do the same thing your whole life. Instead, embrace lifelong learning. You'll need to adapt by acquiring new knowledge and skills throughout your career.

In fact, an estimated 65 percent of children starting school today will ultimately work in jobs that don't yet exist. ★

### **DEFINITIONS**

**EMPATHY:** the ability to understand and share the feelings of another



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## EXAMINE THE DETAILS

1. Using the information in the article and your own thinking, list in the organizer below examples of jobs at risk and jobs not at risk, and skills common to each group.

Jobs at risk:	Jobs not at risk:
Skills common to jobs at risk:	Skills common to jobs not at risk:

2. After completing the organizer, answer the following: *What advice would you give to a friend trying to decide what to do after graduation? Support your advice with reasons.*

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## BETWEEN THE LINES

An **inference** is a conclusion drawn from evidence. A *plausible inference* is supported by evidence in the article and is consistent with known facts outside of the article.

What inference(s) can you draw from the fact that people working in occupations that are at low risk of automation are three times as likely to have a post-secondary degree as people working in jobs that are at high risk of automation?

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## BEYOND THE LINES

Technological geniuses like Bill Gates, Stephen Hawking, and Elon Musk have all warned that artificial intelligence could one day pose a threat to all humankind. Do you think this is a realistic prediction? Conduct some research until you are able to support and defend a position.

## JUST TALK ABOUT IT

1. What other jobs can you suggest that might one day be vulnerable to replacement by automation?
2. As you see it, what are the benefits of automation? What are some drawbacks? In your mind, do the benefits of automation outweigh the drawbacks, or do the drawbacks outweigh the benefits? Explain.

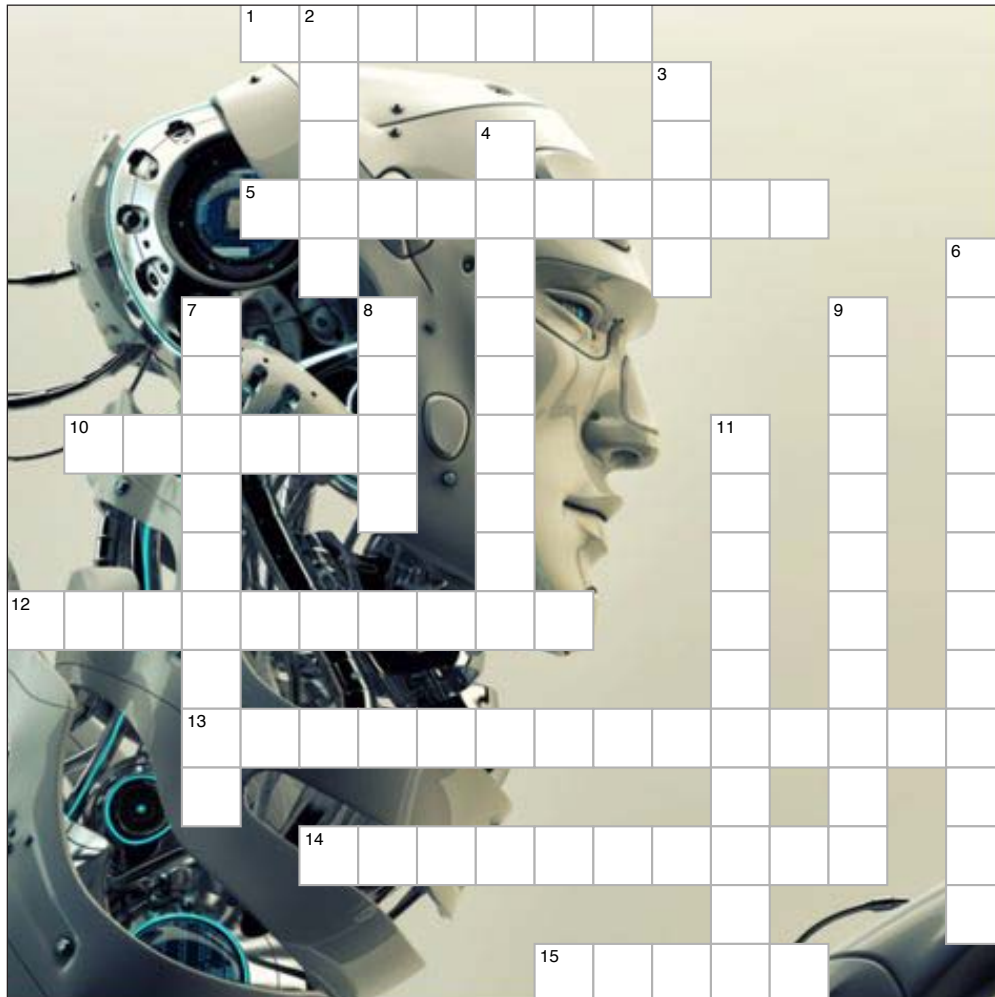
## ONLINE

*Note:* The links below are listed at [www.lesplan.com/en/links](http://www.lesplan.com/en/links) for easy access.

1. Read a CBC article about Ontario's guaranteed-income program at <http://www.cbc.ca/news/politics/minimum-income-hugh-segal-ontario-budget-1.3740373>
2. Critically consider a short YouTube video called "How To Make A Living When Robots Take Our Jobs" at <https://www.youtube.com/watch?v=UfUrgFmUvt8>
3. Meet Watson, one of the smartest computers in the world, by watching the YouTube video "Understand IBM Watson October 2016 Fareed Zakaria" at <https://www.youtube.com/watch?v=3Gs3NQaoClg>
4. Watch a brand new TED Talk about machine intelligence at [http://www.ted.com/talks/zeynep\\_tufekci\\_we\\_can\\_t\\_control\\_what\\_our\\_intelligent\\_machines\\_are\\_learning?utm\\_source=newsletter\\_daily&utm\\_campaign=daily&utm\\_medium=email&utm\\_content=button\\_\\_2016-10-19](http://www.ted.com/talks/zeynep_tufekci_we_can_t_control_what_our_intelligent_machines_are_learning?utm_source=newsletter_daily&utm_campaign=daily&utm_medium=email&utm_content=button__2016-10-19) ★



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### ACROSS

1. the ability to understand and share the feelings of another person
5. the use of science in solving problems
10. Canada's workforce is \_\_\_\_\_ million strong
12. \_\_\_\_\_ Institute of Innovation and Entrepreneurship
13. sector at high risk of automation
14. \_\_\_\_\_ Revolution
15. an unmanned aircraft guided by remote control

### DOWN

2. financial robo-advisers help people invest their \_\_\_\_\_
3. French city with driverless minibus service
4. \_\_\_\_\_ basic income
6. person who organizes, manages and assumes the risk of business
7. many stores already have self-serve \_\_\_\_\_
8. science, technology, engineering and math
9. \_\_\_\_\_ intelligence
11. 42% of Canada's workforce is at high risk of \_\_\_\_\_



# QUIZZES

## TURNING DOWN THE HEAT

Write the letter that corresponds to the best answer on the line beside each question:

- \_\_\_\_\_ 1. **Which country hosted a historic climate change treaty last December?**  
a) Germany  
b) France  
c) United States  
d) Japan  
e) China
- \_\_\_\_\_ 2. **Which two countries are the world's largest polluters?**  
a) Germany and Japan  
b) United States and Russia  
c) China and the United States  
d) Russia and India  
e) United Kingdom and India
- \_\_\_\_\_ 3. **A carbon tax is:**  
a) a tax on fossil fuels  
b) a subsidy for wind and solar energy  
c) a limit on the number of oil rigs  
d) a cap on carbon emissions by all companies  
e) a tariff to encourage alternate forms of transportation
- \_\_\_\_\_ 4. **True or False?** Ban Ki-moon is the Secretary General of the European Union.
- \_\_\_\_\_ 5. **True or False?** The Paris Agreement comes into force on November 4, 2016.
6. As you see it, what is the significance of the Paris Agreement? Explain.

## HURRICANE MATTHEW

Write the letter that corresponds to the best answer on the line beside each question:

- \_\_\_\_\_ 1. **What is the highest reading on the meteorological scale that measures hurricane intensity?**  
a) Category 2  
b) Category 4  
c) Category 5  
d) Category 10  
e) Category 40
- \_\_\_\_\_ 2. **A hurricane is a large system of powerful winds circulating around a:**  
a) centre of high barometric pressure  
b) typhoon  
c) tornado  
d) cyclone  
e) centre of low barometric pressure
- \_\_\_\_\_ 3. **Which country or state was most affected by Hurricane Matthew?**  
a) the Bahamas  
b) Cuba  
c) Florida  
d) Haiti  
e) South Carolina
- \_\_\_\_\_ 4. **True or False?** Water that is pushed toward shore by a hurricane is called a storm surge.
- \_\_\_\_\_ 5. **True or False?** Hurricane Matthew was a Category 4 storm when it hit Haiti.
6. Why was Matthew's impact on Haiti much greater than it was on the United States? Explain.