



# **STEM-based AI education in professional development for K-12 teachers**

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[bit.ly/ActuaAAI](https://bit.ly/ActuaAAI)

It is no different than introducing a new math concept, for example; model the technology you want the students to use, then given them an opportunity to explore the concept on their own. There is a time and place for

Students need time to create, meaningful curriculum based projects that allow them to be creative. These tools allow for this possibility to happen.

## Change is inevitable; growth is optional!

We also need to be educating students on the dangers of AI, how big companies use and manipulate data, etc.

Great opportunities for students to collaborate, create, problem solve and think critically. Time to explore is valuable and would be motivating for students. Lots of DI here as students can extend these

Opportunities for students to explore technology in a variety of ways are wonderful but sessions should be supplemented with teacher interactions, sharing with classmates, and personal reflections.

Can't wait to try this stuff with my students!

Super exciting stuff!

I really appreciated the opportunity to explore new technology with the support of the facilitators. Is it possible for you to continue to share tutorials with us of the newest technologies

Creative processes students will love and enhance their learning experience

I think it is important to inspire students to use their own time to work with the programs.

So many exciting new programs to try with the kids in the Fall! The tinkering is a necessary means to the learning process!

AI....very interesting and I think students will find this really engaging.

If students are educated how algorithms operate they can make more informed decisions which leads to digital citizenship

This is sooooooo COOL!

I loved seeing how AI can be used in our classrooms

I now have some direction and focus with setting up a schoolwide continuum. Super!

I can see how I can use some of this to enhance my students' learning, however it seems we are adding more and more technology for kids in a very technology focused world and the personal connections between each other is

Finding a balance between tinkering/benefit depends on your students and how you structure the tinker time (ie connecting it to other areas such as a writing piece)

Educational value is in the relationships built, and how students are able to increase their understanding/empathy towards others when working on problems together.

I think it is very important to expose students to coding in any way we can.

"Why fit in when you were born to stand out?" People who believe a problem can be solved get busy solving it. William Raspberry

# actua

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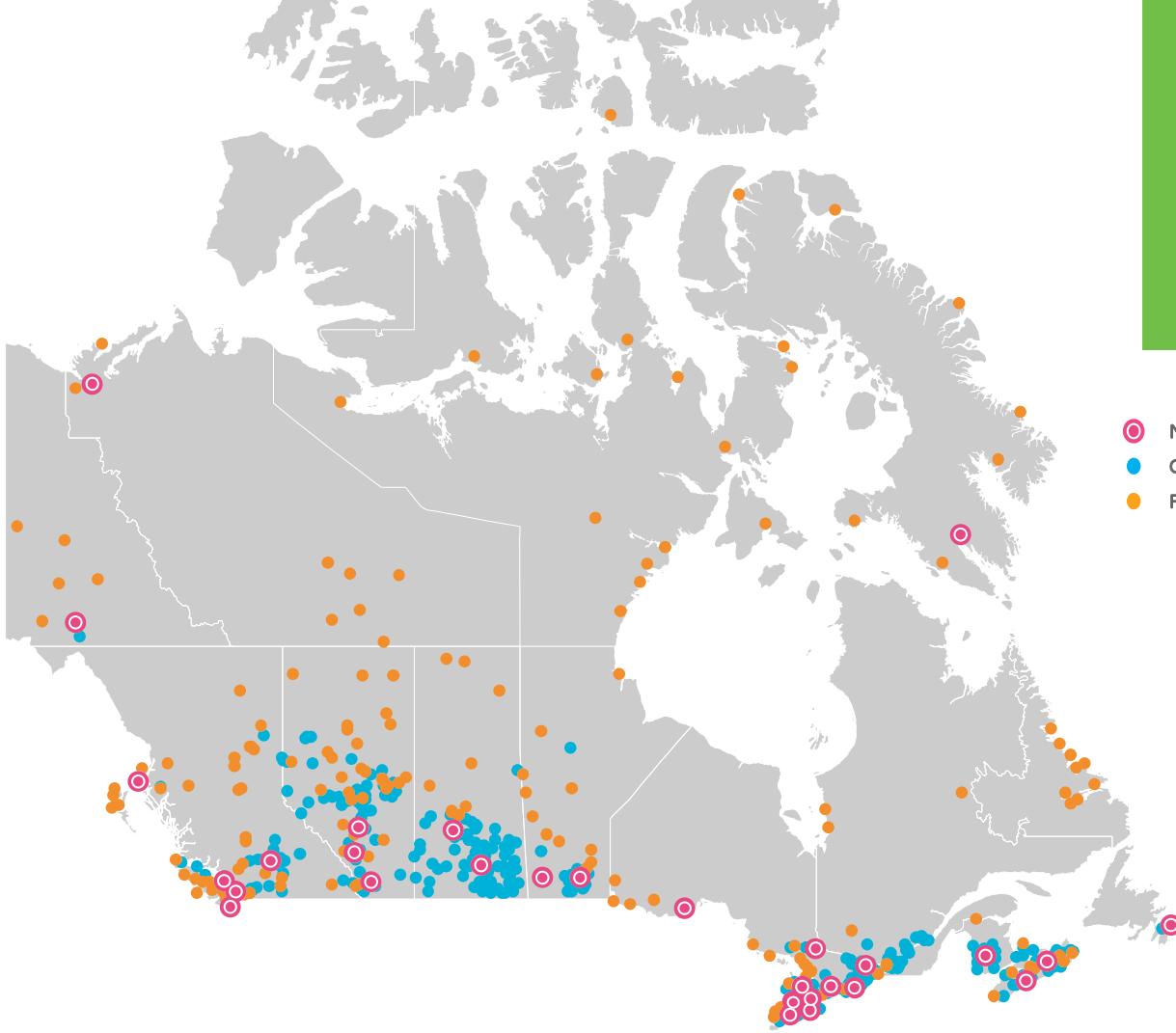


## ACTUA'S MISSION

THROUGH LIFE-CHANGING  
SCIENCE, ENGINEERING,  
AND TECHNOLOGY EXPERIENCES,

**ACTUA INSPIRES  
ALL YOUTH**  
TO ACHIEVE THEIR POTENTIAL  
AND FULFILL THEIR CRITICAL  
ROLE IN THE WORLD

**500+ COMMUNITIES  
250,000 YOUTH  
EVERY PROVINCE  
AND TERRITORY**





**DIGITAL LITERACY  
& DIGITAL CITIZENSHIP  
21ST CENTURY SKILLS**

# #ActuaAI

- Two-year pilot project (2019-2021)
- **Key Components:**
  - Curated content: [actua.ca/ai](http://actua.ca/ai)
  - AI Handbook for K-12 teachers, including pre-service
  - Hands-on teacher workshops (reach: 1,000 educators)
  - Suite of AI activities for youth (reach: 30,000 youth)

# Teacher Training: A Snapshot

- Relationship-focused
- Responsive to community needs
  - Previous experience
  - Technology available
  - Cultural context
- Relevant, actionable, flexible - FUN



# Actua's Artificial Intelligence (AI) for Education Framework

Created with support from Google.org and CIRA, and informed by research from Google's Applied Digital Skills Team, Google Brain, AI4K12.org, CSTA, Microsoft, AI4ALL, and K-12 educators working in AI.

THEME	DATA	PERCEPTION	REPRESENTATION & REASONING	LEARNING	NATURAL INTERACTION	SOCIETAL IMPACTS
Big Idea	Understanding data is foundational to artificial intelligence (AI).	Computers sense and perceive the world around them.	AI creates models to represent other concepts and uses these models for reasoning.	Machine learning happens with data over time.	Interaction between AI and humans mimics communication between people.	AI can impact society in both positive and negative ways.
Investigations	What is data, and how do humans use it?  What are types of data used in data science?  In what ways is data applied in careers and society?	How do machines use sensors to perceive data?  How do machine learning tools classify data?  What are the limitations of machine perception?	How is data used in AI models?  How can models represent other concepts?  How do machine models inform decision making?	How do algorithms demonstrate learning?  What are neural networks?  How does training data influence machine learning?	What does machine-human interaction look like?  How do machines understand natural language?  What is affective computing; what is consciousness?	What ethical considerations arise when we use and create AI in society?  What biases exist in AI algorithms?  How can AI be leveraged to face global challenges?



# Activity: Perception Challenge

How might you design an AI system using sensing & perception?



## Your task:

Design an AI system using one or more sensors to face a real-world challenge. Things to consider:

- What will the system sense, and why?
- What is perceived based on sensory inputs?
- How will this creation be useful to others?

# Connections to STEM

## Concept Specific (Examples):

- Math: Aggregating and classifying data, mapping, modeling, variables, functions, sequencing & logic
- Science: Senses, classification systems, neural pathways, data collection
- Also language (homophones, semantics), social (bias, decision)



# Connections to STEM

## Broader/Interdisciplinary:

- How AI is applied in post-secondary research across disciplines; use in industry (career readiness)
- Debate, critical thinking
- Student competencies





# Want to know more or get involved?

- Rolling updates to [actua.ca/ai](http://actua.ca/ai)
- Teacher Handbook & content development advisory group
- Canada-based training for educators

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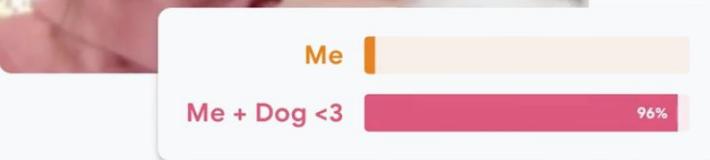
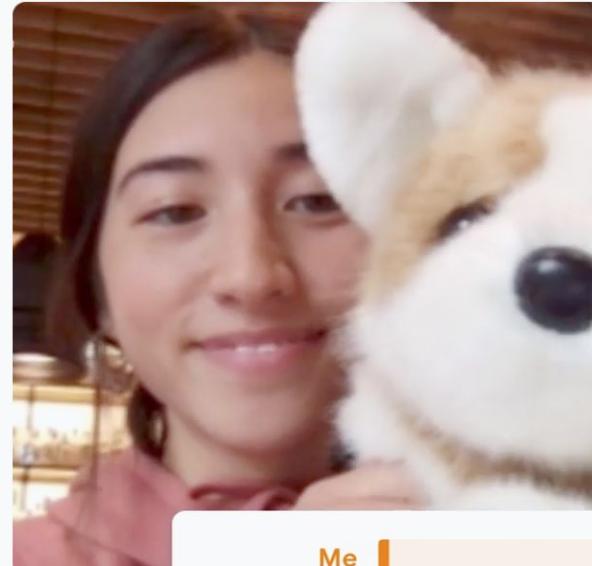
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WORLD

# Teachable Machine

**Train a computer to recognize your own images, sounds, & poses.**

A fast, easy way to create machine learning models for your sites, apps, and more – no expertise or coding required.



**Get Started**

Hey Google, talk to

# MixLab

Try saying:  
“Give me a punk bass.”

