

# STEM to STEAM Education



## BUILDING CONFIDENCE ALONGSIDE SKILLS AND KNOWLEDGE TO BRIDGE THE GAP FOR FUTURE WOMEN IN STEAM

SUPPLIED

**T**rafalgar Castle School is committed to preparing students to become leaders in STEAM careers – not only by developing their skills and knowledge but also building their confidence.

Based in Whitby, Ontario, Trafalgar Castle School is a school for girls from Grades 4 to 12. Preparing students for their futures begins in the youngest grades. Along with a variety of other subjects, students move through their science, technology, arts and math programs, tackling increasingly complex projects and concepts. This ensures a progression of skills so that by the time they graduate, they will be equipped with an array of tools to succeed in their chosen career in STEAM (science, technology, engineering, arts and mathematics) or in other fields, and in all aspects of their lives.

The importance of nurturing confidence in students is embedded in Trafalgar Castle School's motto, "Nothing a Trafalgar girl can't handle." This goal is integrated into every aspect of school life – academics, student clubs and teams, and

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**Laurie Kuchirka**  
Dean of Academics,  
Trafalgar Castle School



immersive educational experiences with external partners.

Although women's representation in science and technology fields is advancing, the gender gap still exists, says Kate Hebdon, the deputy head of Trafalgar Castle School. "With fewer role models, young women may doubt their ability to be 'doers' in those fields. We want them to know that they belong at those tables and have what it takes to be innovators and leaders."

Confidence comes when students are immersed in hands-on learning, continually transferring classroom theory to real-world applications, says Ms. Hebdon.

She says the older approach to STEM education was "teach the theory" up to the end of high school and then send students into the deeper waters of college or university, or in the workplace.

"We're forging new ground by giving the girls opportunities to try and test concepts in the real world as early as Grade 4. As they learn the fundamentals of math, for example, we're not telling them that they will

have a chance to put this into action someday when they have a job.

"We're telling them: 'You're going to do it now – while you have the safety net and support of the school to guide you on your journey.'"

This approach encourages the students to grapple with failure and build the fortitude to pull themselves back up and try something new, she says. "Take risks and don't be afraid to fail. You learn through failure every step of the way."

### FUTURE-READY COMPETENCIES

"We're in an age of unprecedented, exponential change in the world, and we want our graduates to have capacities and skills transferable to all careers – those that exist today as well as those yet to be created," says Laurie Kuchirka, dean of academics.

To achieve this goal, Trafalgar Castle School has developed seven future-ready competencies: collaborative leaders, systems thinkers and designers, creators and innovators, critical thinkers and informed decision-makers, clear and confident communicators, global citizens, and self-aware and self-directed learners and unlearners.

"These competencies are the anchor that permeates all of our subject areas," she says. "And they all flow together. We know that the tech designers of the future need to nurture their creative mindset to bring forward tomorrow's innovative products."

Several projects and initiatives incorporate several or all of the competencies. One example: A Grade 8 project to improve accessibility in the 150-year-old castle that houses the school.

"The students are envisioning ways that we can make our school more accessible, and then designing and coding prototype robots to test manoeuvrability in the school environment," says Ms. Kuchirka. "And students in Grades 4 to 6 are designing a playground, and others are doing citizen-science projects on the school grounds to try to improve its biodiversity."

Trafalgar Castle School has recently incorporated generative AI into

the curriculum. Students are learning how to use AI tools while also engaging in critical thinking about the role and limitations of this transformative technology, she explains.

"In visual arts classes, students use generative AI to create images, which they augment themselves. At the same time, they're discussing issues such as how much of these designs need to be human content versus AI-generated? What are the relevant ethics and limitations of human expression in art?"

### BEYOND THE CASTLE

In addition to all the hands-on learning experiences in the curriculum, Trafalgar Castle School also has a unique, annual experiential learning program for all grades, called Beyond the Castle.

"It's a different experience for every grade for one week in January or February, in which the students touch base with either a college or university to work in tech labs and take part in field studies, workshops and panel discussions," says Penny Senior, who co-ordinates Beyond the Castle and other experiential learning programming, while also teaching math, science and technology to Grades 8 to 10.

"Every year, our Grade 9 students spend a day in Ontario Tech University's Maker Lab, where they can experiment with video games and building remote controls, for example, while learning about the university's programs and careers in STEAM," says Ms. Senior.

Another key partnership is with Deloitte, she says. "For the Grade 10 students, we focus on women in STEAM, and bring them to Deloitte to learn about both the opportunities and the challenges."

One activity is to immerse students in the company's "Greenhouse," the lab where it develops all their new technologies. In addition, women from all levels of the company hold a "fireside chat" with the students about their career paths.

"They talk about incorporating their careers into the rest of their lives – how to balance having a family with success in the workplace," Ms. Senior explains.



## NOTHING A TRAFALGAR GIRL CAN'T HANDLE

Whether it's science and technology, art or athletics, there's no challenge too great for a Trafalgar girl.

A school for girls | day & boarding | grades 4-12 | Whitby, Ontario



Trafalgar Castle  
School

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