

# GREATER ESSEX COUNTY DISTRICT SCHOOL BOARD

## Key Competencies to Navigate the 21st Century Learner

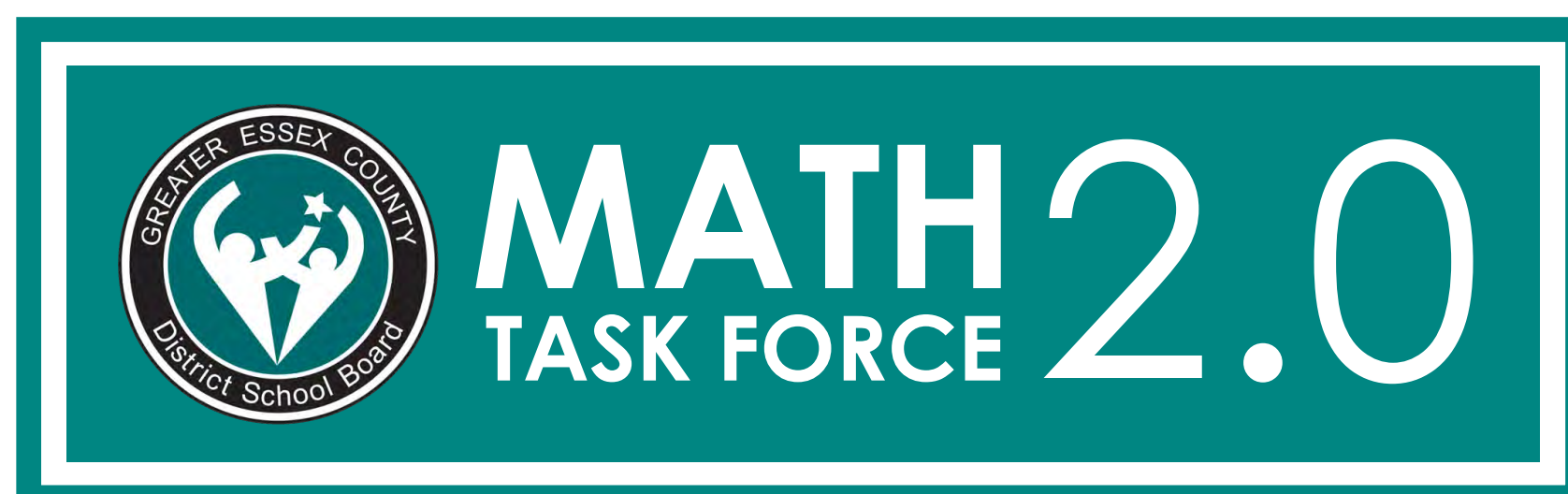
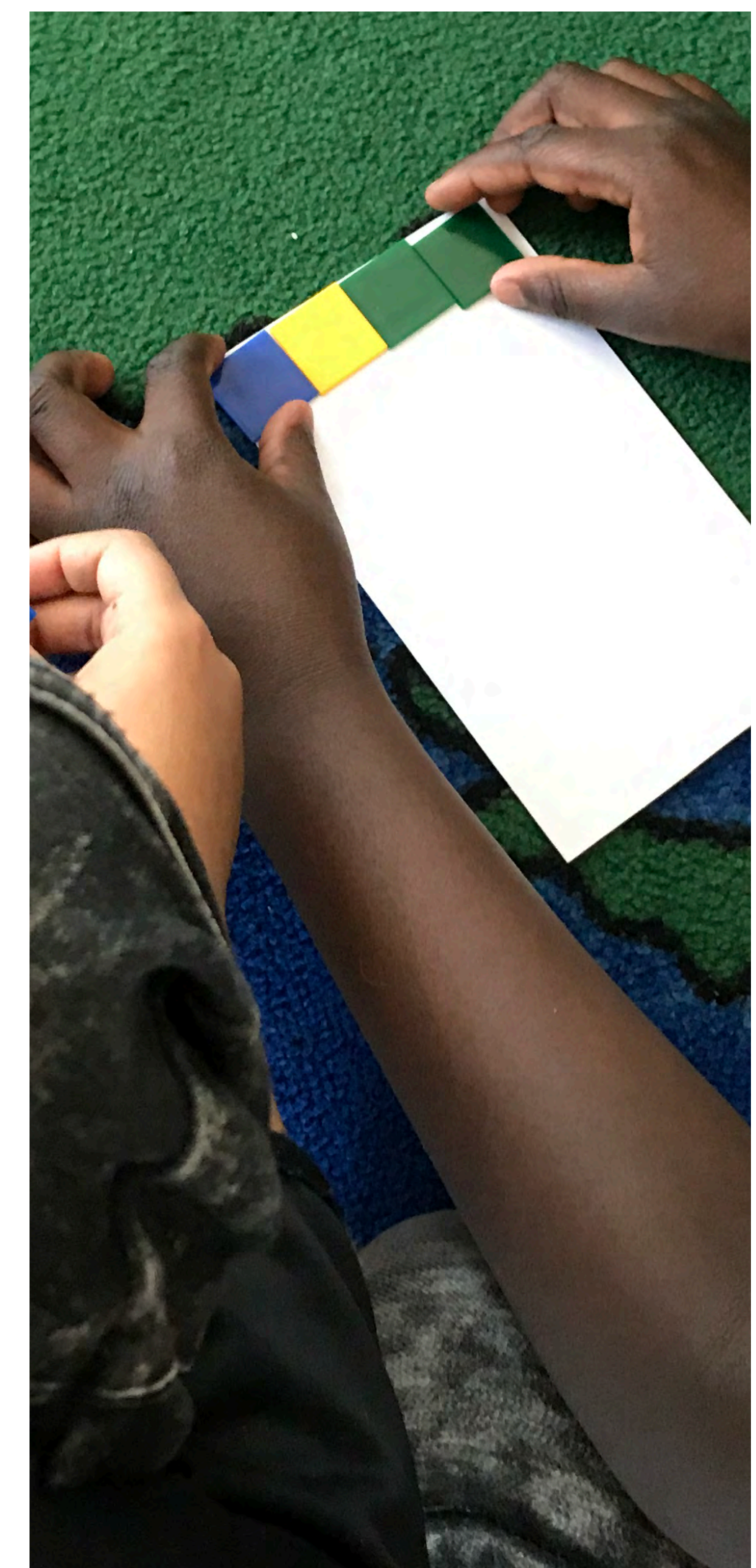
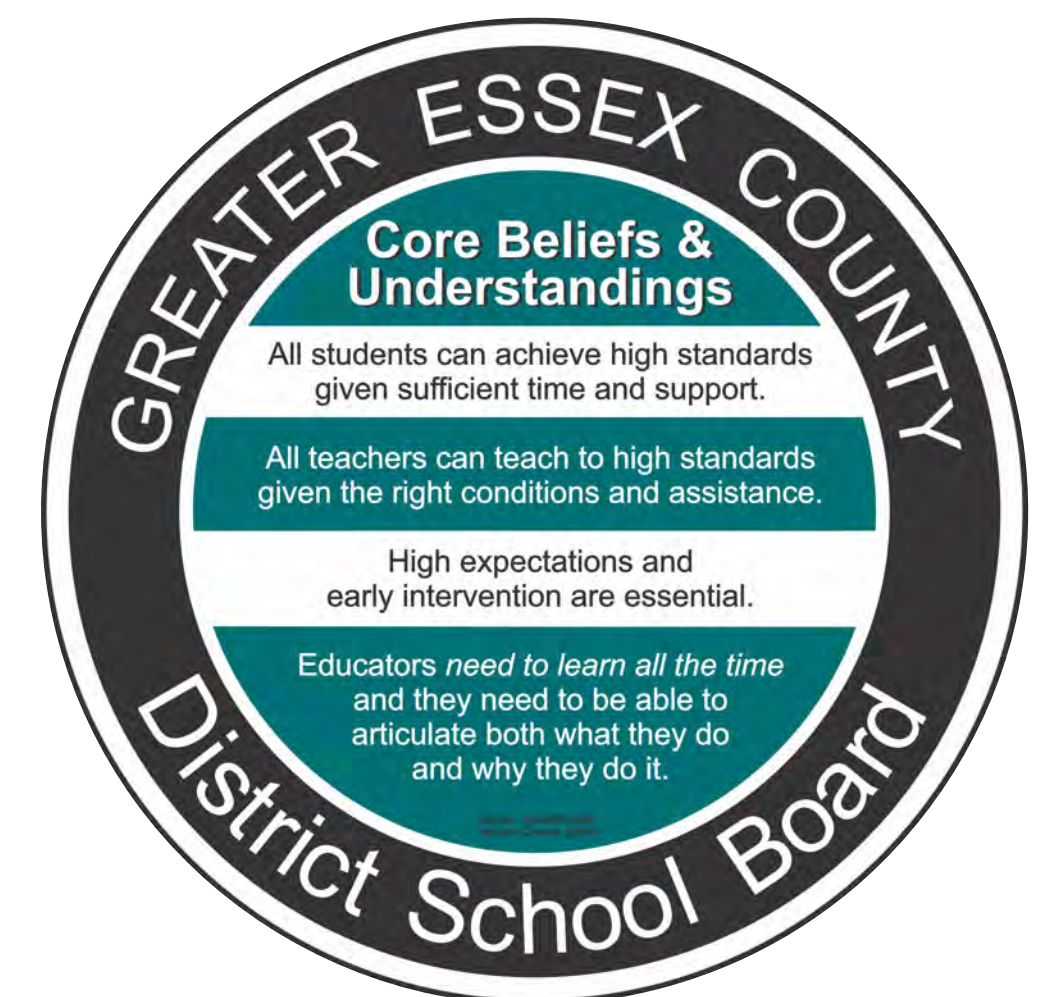
Greater Essex County District School Board is dedicated to preparing all students for success. It is our belief that students must develop the necessary competencies to thrive in an ever-changing world. A current challenge for educators is knowing how to prepare students for their future where they will be asked to navigate a technologically advanced, globally connected and socially conscious world. GECDSB aims to create opportunities for students to develop their 21st century competencies through engaging classrooms and experiential learning opportunities. The GECDSB Math Vision promotes the learning of mathematics in a way that fosters creativity, communication, collaboration and problem solving.

*“The Greater Essex County District School Board provides mathematics education that engages and empowers students through collaboration, communication, inquiry, critical thinking, and problem-solving, to support each student’s learning and nurture a positive attitude towards mathematics.”*

GECDSB, A Vision for Mathematics, 2016

The purpose of this research brief is to share the research and insight garnered from the continued work of the Greater Essex County District School Board’s Math Task Force. These papers are rooted in the GECDSB core beliefs, the Full-Day Early Learning—Kindergarten program and the Ontario Mathematics Curricula for grades 1–8, 9–10, and 11 & 12. The briefs are meant to elevate, enrich and extend the discourse of mathematics education and content pedagogy with the intention of encouraging a positive and productive disposition toward mathematics for all learners.

Each paper provides a list of sources to extend the professional conversation and enhance the learning. In addition, live links appear at the end of each paper with connections to various resources.







## Key Competencies to Navigate the 21st Century Learner

“Ontario is committed to helping every child and student achieve success and well-being. The primary goal of the province’s education system is to enable students to develop the knowledge, skills, and characteristics that will lead them to become personally successful, economically productive, and actively engaged citizens. Researchers acknowledge that the need to engage in problem solving and critical and creative thinking has “always been at the core of learning and innovation”. What’s new in the 21st century is the call for education systems to emphasize and develop these competencies in explicit and intentional ways through deliberate changes in curriculum design and pedagogical practice. The goal of these changes is to prepare students to solve messy, complex problems – including problems we do not yet know about – associated with living in a competitive, globally connected, and technologically intensive world.”

(Ontario, 2016)

**21st century competencies have measurable benefits for multiple areas of life and therefore are critical for all students.**

(Ontario Ministry of Education, 2015)

“Research supports the need for today’s students to engage in “deeper learning” – or learning that allows students to take what is learned in one situation and apply it to new situations. Deeper learning involves the interplay of the cognitive (thinking/ reasoning), intrapersonal (behaviour/ emotions), and interpersonal (communication/collaboration). Through the process of deeper learning, students develop 21st century competencies, which can be defined as knowledge and skills that are transferable.” (Ontario Ministry of Education, 2016)



Figure 1: “21st century skills” grouped into three broad domains (National Research Council, July 2012, p. 2)

### Defining 21st Century Competencies

Taken from the 2017 “Framework of Global Competencies” document created by the Ontario Ministry of Education, the competencies are defined below:

#### Critical Thinking and Problem Solving

Critical thinking and problem solving involve addressing complex issues and problems by acquiring, processing, analyzing and interpreting information to make informed judgments, decisions and actions. The capacity to engage in cognitive processes to understand and resolve problems includes the willingness to achieve one’s potential as a constructive and reflective citizen. Learning is deepened when situated in meaningful, real world, authentic experiences.

#### Communication

Communication involves receiving and expressing meaning (e.g., reading and writing, viewing and creating, listening and speaking) in different contexts and with different audiences and purposes. Effective communication increasingly involves understanding both local and global perspectives, societal and cultural contexts, and adapting and changing using a variety of media appropriately, responsibly, safely, and with regard to one’s digital footprint.

#### Collaboration

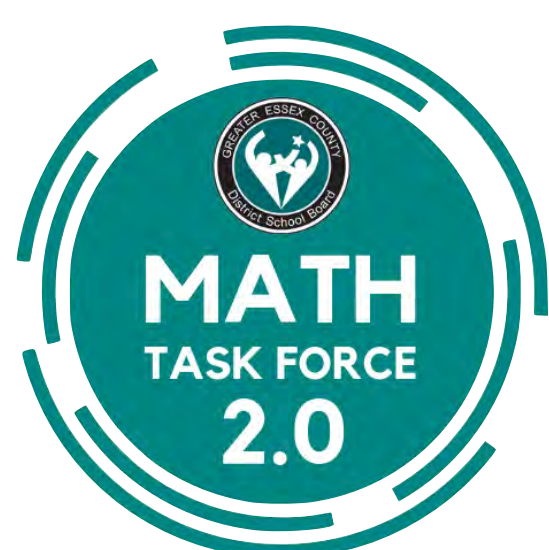
Collaboration involves the interplay of the cognitive (including thinking and reasoning), interpersonal, and intrapersonal competencies necessary to participate effectively and ethically in teams. Ever-increasing versatility and depth of skill are applied across diverse situations, roles, groups, and perspectives in order to co-construct knowledge, meaning, and content, and learn from, and with, others in physical and virtual environments. (Ontario, 2016)

#### Creativity and Innovation

Innovation, creativity, and entrepreneurship involve the ability to turn ideas into action to meet the needs of a community. The capacity to enhance

**“Today, schools need to prepare students for more rapid economic and social change than ever before, for jobs that have not yet been created, to use technologies that have not yet been invented, and to solve social problems that we do not yet know will arise.”**

(Schleicher, 2016)





concepts, ideas, or products to contribute new-to-the-world solutions to complex economic, social, and environmental problems involves leadership, taking risks, independent/unconventional thinking and experimenting with new strategies, techniques, or perspectives, through inquiry research. Entrepreneurial mindsets and skills involve a focus on building and scaling an idea sustainably.

### **Self-Directed Learning**

Self-directed learning means: becoming aware and demonstrating agency in one's process of learning, including the development of dispositions that support motivation, perseverance, resilience, and self-regulation. Belief in one's ability to learn (growth mindset), combined with strategies for planning, monitoring and reflecting on one's past, present, and future goals, potential actions and strategies, and results. Self-reflection and thinking about thinking (metacognition) promote lifelong learning, adaptive capacity, well-being, and transfer of learning in an ever-changing world.

### **Citizenship**

Citizenship involves understanding diverse worldviews and perspectives in order to address political, ecological, social, and economic issues that are crucial to living in a contemporary, connected, interdependent, and sustainable world. It also includes the acquisition of knowledge, motivation, dispositions, and skills required for an ethos of engaged citizenship, with an appreciation for the diversity of people, perspectives, and the ability to envision and work toward a better and more sustainable future for all.

(Ontario Ministry of Education, 2017)

### **21st Century Competencies and the GECDSB Math Vision**

GECDSB fosters the development of 21st Century competencies, as demonstrated through the Math Vision. With a focus on productive disposition and learning through problem solving, students are positioned to tackle rich tasks using a variety of strategies.

With a focus on productive disposition (the habit of seeing mathematics as sensible, useful, and worthwhile with a belief in diligence and one's own

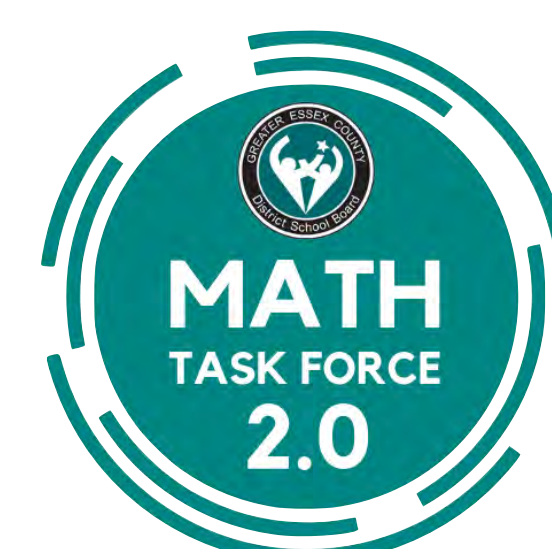
efficacy, National Research Council, 2001), GECDSB has been committed over the years to the development of a "Growth Mindset" . Professional development has been centred around strategies supported by research from Carol Dweck and Jo Boaler. Instruction at GECDSB has been rooted in problem solving through rich tasks. *Principles to Actions* defines a meaningful task with a high level of cognitive demand "(as a tasks that allows) students to engage in active inquiry and exploration or encourage students to use procedures in ways that are meaningfully connected with concepts or understanding." (NCTM, 2014) The ability for students to select and justify their strategy supports critical thinking and students become the authors of their learning. As John Hattie states in *Visible Learning in Mathematics*, "School is a time to apprentice students into the act of becoming their own teachers. We want them to be self-directed, have the dispositions needed to formulate their own questions, and possess the tools to pursue them. In other words, as students' learning becomes more visible to them, we want it to become the catalyst for continued learning, whether the teacher is in the room or not." (Hattie, 2017) As we move away from a teacher directed learning environment, students are being asked to think as they make sense of and solve complicated math problems. The teacher's role in this environment is that of co-learning and facilitator, as they press students to think deeply and encourage connections through purposeful questioning. With the promotion of collaborative problem solving, students are also developing their interpersonal skills, including conflict resolution and see the benefit of considering the collective knowledge of the group and different perspectives. The consolidation of math learning allows students to engage respectfully in discourse where they analyze and critique other students' thinking in order to deepen their understanding and support the learning of others. "Students must also have opportunities to talk with , respond to, and question one another a part of the discourse community..."(NCTM, 2014)

***"Changing times are transforming the nature of competencies that have been valuable throughout history, such as communication and collaboration."***

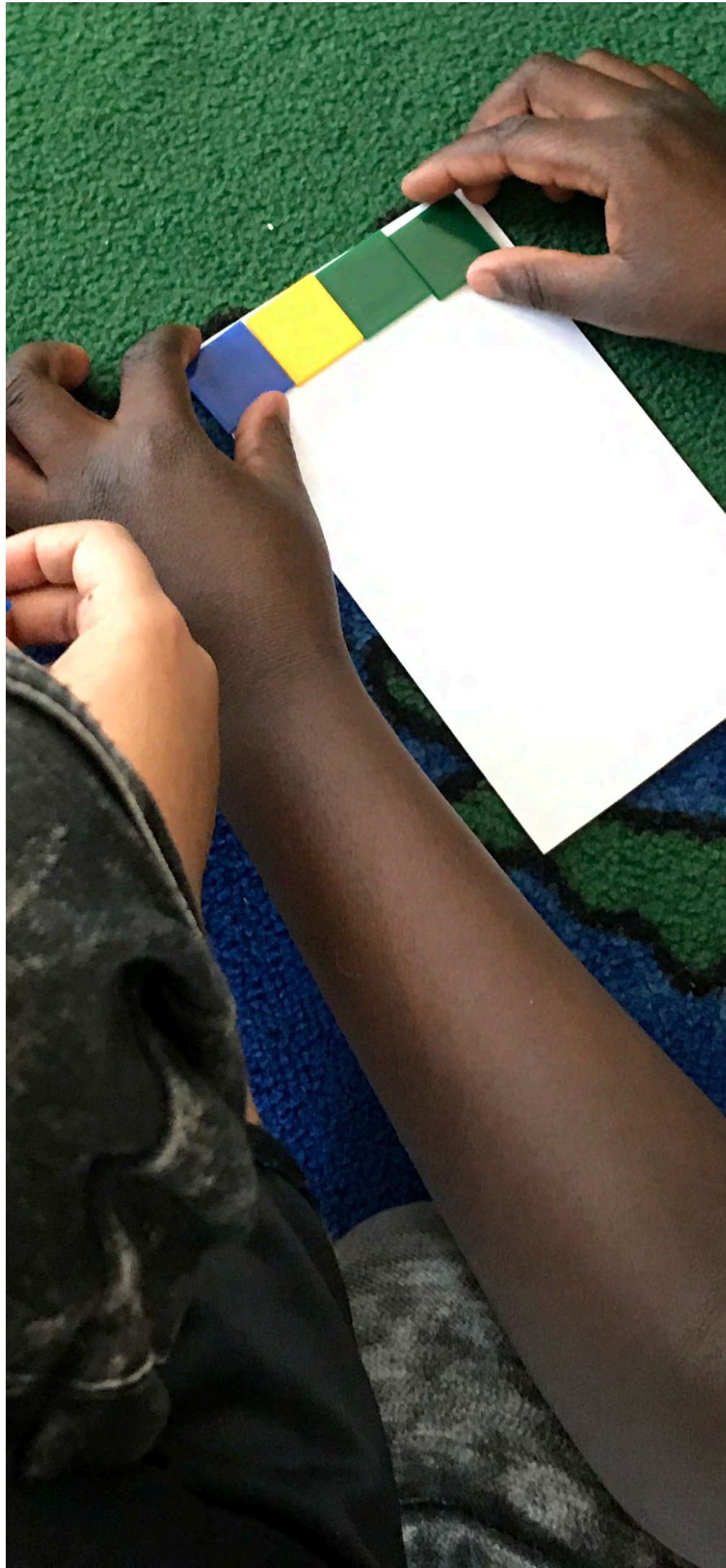
*(Ontario Ministry of Education, 2016)*

***"There is a growing body of research (Dweck, 2010; Duckworth, Matthews, Kelly, & Peterson, 2007; Tough, 2012) demonstrating that non-academic, intrapersonal competencies such as perseverance, grit, tenacity, and a growth mindset have a strong relationship with an individual's capacity to overcome challenges and achieve long-term success."***

*(Ontario Ministry of Education, 2016)*







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| <p><b>Critical Thinking and Problem Solving</b></p> <ul style="list-style-type: none"> <li>Solves meaningful, real-life, complex problems (1), (6)</li> <li>Takes concrete steps to address issues</li> <li>Designs and manages projects</li> <li>Acquires, processes, interprets, and analyses information to make informed decisions (critical and digital literacy)</li> <li>Engages in an inquiry process to solve problems (1)</li> <li>Makes connections and transfers learning from one situation to another (1), (6)</li> </ul> | <p><b>Innovation, Creativity, and Entrepreneurship</b></p> <ul style="list-style-type: none"> <li>Contributes solutions to complex problems (3)</li> <li>Enhances a concept, idea, or product</li> <li>Takes risks in thinking and creating</li> <li>Makes discoveries through inquiry research (1)</li> <li>Pursues new ideas to meet a need of a community (3), (6)</li> <li>Leads and motivates with an ethical entrepreneurial spirit (1), (3)</li> </ul>   | <p><b>Learning to Learn / Self-Aware &amp; Self-Directed Learning</b></p> <ul style="list-style-type: none"> <li>Learns the process of learning (metacognition) (1),(3),(4),(5),(7)</li> <li>Believes in the ability to learn and grow (growth mindset) (1), (4), (5)</li> <li>Perseveres and overcomes challenges to reach a goal (1), (5)</li> <li>Self-regulates in order to become a lifelong learner (1), (4), (5), (7)</li> <li>Reflects on experience to enhance learning (1), (7)</li> <li>Cultivates emotional intelligence to understand self and others (1), (2),(4)</li> <li>Adapts to change and shows resilience to adversity (1), (5)</li> <li>Manages various aspects of life – physical, emotional (relationships, self-awareness), spiritual, and mental well-being (5)</li> </ul> |
| <p><b>Collaboration</b></p> <ul style="list-style-type: none"> <li>Participates in teams; establishes positive relationships</li> <li>Learns from, and contributes to, the learning of others (1)</li> <li>Co-constructs knowledge, meaning, and content (1)</li> <li>Assumes various roles on the team</li> <li>Manages conflict</li> <li>Networks with a variety of communities/groups</li> <li>Respects a diversity of perspectives (2), (3)</li> </ul>  | <p><b>Communication</b></p> <ul style="list-style-type: none"> <li>Communicates effectively in different contexts in oral and written form in French and/or English</li> <li>Asks effective questions to acquire knowledge (6)</li> <li>Communicates using a variety of media (1), (5)</li> <li>Selects appropriate digital tools according to purpose (1)</li> <li>Listens to understand all points of view (2), (3), (6)</li> <li>Gains knowledge about a variety of languages (2), (6)</li> <li>Voices opinions and advocates for ideas</li> </ul> | <p><b>Global Citizenship</b></p> <ul style="list-style-type: none"> <li>Contributes to society and the culture of the local, global, and digital community in a responsible, accountable, and ethical manner (2), (6)</li> <li>Engages in local and global initiatives to make a difference (6)</li> <li>Learns from and with diverse people (2), (5), (6)</li> <li>Interacts safely and responsibly within a variety of communities (5), (6)</li> <li>Creates a positive digital footprint</li> <li>Relates to the environment and is mindful of the importance of all living things (2), (3)</li> </ul>  |

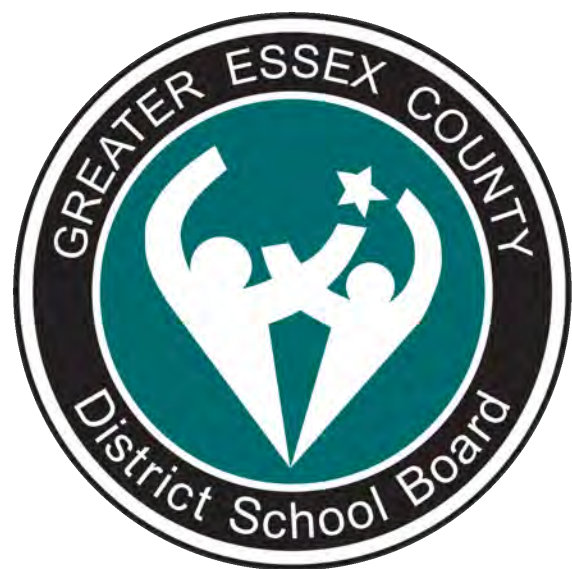
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## LINKS

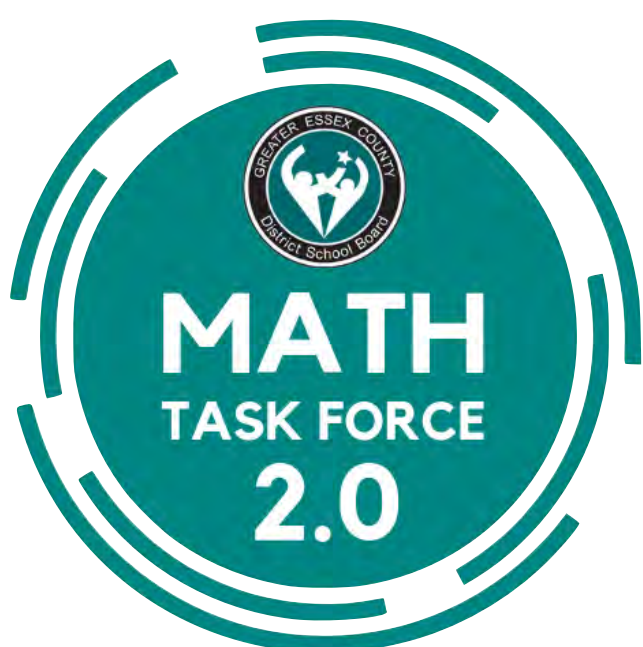
- ONTARIO MINISTRY OF EDUCATION - Framework of Global Competencies  
[http://www.edugains.ca/resources21CL/21stCenturyLearning/FrameworkofGlobalCompetencies\\_AODA.pdf](http://www.edugains.ca/resources21CL/21stCenturyLearning/FrameworkofGlobalCompetencies_AODA.pdf)
- FULLAN AND LANGWORTHY – A RICH SEAM  
[http://www.michaelfullan.ca/wp-content/uploads/2014/01/3897.Rich\\_Seam\\_web.pdf](http://www.michaelfullan.ca/wp-content/uploads/2014/01/3897.Rich_Seam_web.pdf)
- THE LEARNING EXCHANGE - Deep Learning in a Digital World  
<http://thelearningexchange.ca/projects/deep-learning-digital-world/>



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BUILDING TOMORROW TOGETHER. EVERY LEARNER, EVERY DAY.