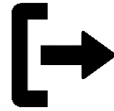


**Worthwhile Mathematical Tasks**

The selected tasks and examples support how students view, develop, use and make sense of the mathematics.

**We can...**

\_\_\_begin lessons with good tasks (low-floor/high ceiling; open)



The way mathematical tasks are realized in the classroom and experienced by students depends on the classroom environment, the tools and representations available for them to use, and the nature and focus of classroom discourse.<sup>5</sup>

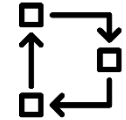
**Classroom Discourse**

Opportunities are provided for students to justify and explain their thinking; examine conjectures, disagreements & counter-arguments.

**We can...**

\_\_\_use verbal instructions

\_\_\_ facilitate consolidation of students’ thinking by selecting, sequencing, and connecting solutions<sup>6</sup>; negotiate meaning for emerging understandings)



\_\_\_communicate where a student is and where they are going

\_\_\_encourage students to create meaningful notes (“What matters?” Success Criteria?)

**We can...**

\_\_\_form [and use] visibly random groups (#vrg)

\_\_\_defront the classroom

\_\_\_answer only *keep thinking* questions

\_\_\_use hints and extensions to manage *flow*<sup>4</sup>

\_\_\_foster autonomous actions

\_\_\_communicate where a student is and where they are going (descriptive feedback)

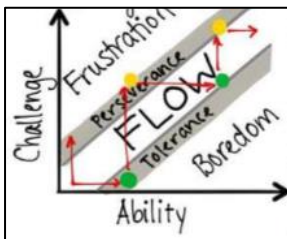
\_\_\_evaluate what we value (e.g., process over product; group + individual<sup>4</sup>)

\_\_\_report out on data; not points (i.e., disaggregate evidence<sup>4</sup>; “What story does the data tell?”)

*Engaging the Pedagogical System*<sup>1,5</sup>

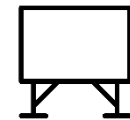
Through

*Building a Thinking Classroom*<sup>2,7</sup>



**We can...**

\_\_\_use vertical non-permanent surfaces (#vnps)



\_\_\_encourage students to create meaningful notes (“What matters?” Success Criteria?)

\_\_\_assign *check your understanding* questions (self-assess<sup>4</sup>)

\_\_\_communicate where a student is and where they are going (descriptive feedback)



**Non-Threatening Classroom Environment**

The classroom community encourages students to think, reason, communicate, reflect upon and critique that which they encounter.

**Tools & Representations**

Students make their mathematical thinking visible. Representations and/or tools are used to do so, and they help students clarify their understandings.

**Goal:**

We are learning to improve student achievement, well-being and engagement in mathematics.<sup>3</sup>

*School Improvement Through a Thinking Classroom – Professional Learning Template for Learning Teams (Mathematics)*

1)

Anthony, G., & Walshaw, M. (n.d.). The Pedagogical System with Reflective Questions. Retrieved December 30, 2017, from <https://sim.thelearningexchange.ca/the-pedagogical-system-with-reflective-questions/>

2)

Liljedahl, P. (n.d.). Building Thinking Classrooms-Keynote. *OAME Leadership Conference, Ottawa (Nov 10, 2017)*. Retrieved December 30, 2017, from <http://www.peterliljedahl.com/presentations>

3)

The Learning Exchange. (n.d.). Ontario's Renewed Mathematics Strategy. Retrieved December 31, 2017, from <https://rms.thelearningexchange.ca/>

4)

Wheeler, L. (2017, November 21). Re: My #ThinkingClassroom Trio of Sketchnotes & Some Photos [Web log comment]. Retrieved December 31, 2017, from [https://twitter.com/wheeler\\_laura/status/933121783506653184](https://twitter.com/wheeler_laura/status/933121783506653184)

5)

Anthony, G. and Walshaw, M. (2009). *Effective Pedagogy in Mathematics*. [http://www.iaoed.org/downloads/EdPractices\\_19.pdf](http://www.iaoed.org/downloads/EdPractices_19.pdf)

6)

Smith, M. S., & Stein, M. K. (2011). *5 practices for orchestrating productive mathematics discussions*. Reston, VA: National Council of Teachers of Mathematics.

7)

Liljedahl, P. (2016). Building thinking classrooms: Conditions for problem solving. In P. Felmer, J. Kilpatrick, & E. Pekhonen (eds.) *Posing and Solving Mathematical Problems: Advances and New Perspectives*. New York, NY: Springer.

**Goal:**

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