**Pedagogical System for Teaching & Learning Mathematics (Teacher vs Student Survey Prompts)**

*To what degree do you think…?*

****Worthwhile Mathematical Tasks

1-Teacher: …the task builds conceptual understanding and computational and procedural fluency?

*Student: …the problems I’m given help me to build my understanding and improve my math skills.*

2-Teacher: …the task poses appropriate levels of mathematical challenge?

*Student: …the problems I’m given challenge me in ways that help me to learn.*

3-Teacher: ...the task allows for students to demonstrate original thinking about important concepts and relationships?

*Student: …the problems I’m given allow me to show my thinking.*

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*To what degree do you think…?*

Note: Students should be provided a list of tools & representations prior to the survey and/or have had some introduction to/experience with them.

* Representation = an organization of a student’s thinking
	+ Examples of representations include: concrete materials, pictures, diagrams, graphs, tables, numbers, words, and symbols (Ontario Curriculum-Grades 1 to 8, p16)
* Tool = digital or physical objects that are used to show a representation
	+ Examples of tools include: calculators, computers (e.g., dynamic geometry, statistical, graphical, and spreadsheet software), manipulatives (e.g., Cuisenaire rods, base ten blocks, linking cubes, pattern blocks, fraction strips, rekenreks, geoboards) (Ontario Curriculum, Grades 1 to 8, pp.14-15)

Tools & Representations

4-Teacher: ...tools and representations were used as thinking spaces, enabling students to communicate ideas that would otherwise be difficult to do?

*Student: …the use of tools and representations makes it easier to explain my ideas.*

5-Teacher: ...students had access to multiple representations to develop conceptual understanding and computational flexibility?

*Student: …representing, in different ways, helps me to make sense of math.*

6-Teacher: ...students were assisted to make connections through carefully sequenced examples, including examples of students' own solution strategies?

*Student: …I often make (or am coached to make) connections between my work and my peers’ work.*

7-Teacher: ...students developed a fuller conceptual understanding by exploring different representations of mathematical content?

*Student:* (this prompt was removed, as #5 & #6 represent the essence of #7)

Classroom Discourse

*To what degree do you think…?*

8-Teacher: ...the learning experience was planned to enable students to build on their existing proficiencies and experiences?

*Student: …math lessons build on my strengths and experiences.*

9-Teacher: ...there was a focus on the mathematical thinking that students were engaged in, with teacher questions posed to challenge and extend thinking?

*Student:*

*…questions asked focus my thinking on how I’m solving a problem.*

*…questions asked focus my thinking on how I could solve a problem differently.*

10-Teacher: ...students' misconceptions and errors were treated as a necessary part of learning and opportunities were provided for students to learn from these?

*Student:*

*…I learn better when mistakes are inspected in lessons.*

*…I learn better when misunderstandings are inspected in lessons.*

11-Teacher: ...classroom discussions were facilitated with a focus on mathematical argumentation?

*Student:*

*…discussions in math show respect for the ideas of others.*

*…discussions in math help me to understand concepts better.*

12-Teacher: ...modelling of the process of explaining and justifying was done?

*Student: …I am encouraged to explain my thinking and give reasons for my answers.*

13-Teacher: ..."re-voicing" was used to highlight ideas that came directly from students to help them in the development of their emerging understandings?

*Student: ...to understand new ideas, my peers’ thinking is “re-voiced” by my teacher or others.*

14-Teacher: ...different mathematical interpretations were allowed and the community was encouraged to discuss them and resolve them by addressing misconceptions as necessary?

*Student:* (This prompt might be replaced by those in #10 and #11.)

15-Teacher: ...the use, as well as understanding, of appropriate mathematical terms, expressions, and symbols was fostered?

*Student: …I am encouraged to understand and use math terms, expressions, and symbols.*

16-Teacher...modelling took into account students' informal understandings of the mathematical language in use?

*Student: …my explanations are used by my teacher and my peers to help others understand.*

(Note: With re-voicing, some or all of a student’s explanation is repeated (listening interpretively). The student is then asked if the re-telling captured the meaning of the student’s explanation.)

Non-Threatening Classroom Environment

*To what degree do you think…?*

17-Teacher: ...time was provided for students to think for themselves, to ask questions, and to take intellectual risks?

*Student: In math class, I have think time, time to ask questions, and I’m encouraged to share my thinking.*

18- Teacher: ...there was high yet realistic expectations?

*Student: In math class, I am encouraged to meet expectations for learning as best as I can.*

19-Teacher: ...opportunities exist for students to make sense of mathematical ideas through independent working/thinking time as well as collaboratively (partner and small group)?

*Student:*

*In math class, there are times when I work independently at making sense of ideas.*

*In math class, there are times when I work in groups to make sense of ideas.*

20-Teacher: …during whole-class discussions, the teacher listened to students' ideas and monitored how often students contributed, and kept the discussion focused on mathematical learning?

*Student:*

*In math class, my teacher and peers listen to my ideas.*

*In math class, our discussions focus on helping everyone improve their learning.*

21-Teacher: ...discussions (whole and small group) are organized to address alternative interpretations or misconceptions of mathematics?

*Student:*

*In math class, our discussions honor different points of view.*

*In math class, our discussions help students to self-correct.*

Readability Statistics (Student Version)

The entire student version of the survey has the following readability statistics (as determined in MS-Word):



Sources

Anthony, G. and Walshaw, M. (2009). *Effective Pedagogy in Mathematics*. <http://www.iaoed.org/downloads/EdPractices_19.pdf>

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/>