Appendix A
Task Analysis Framework Given to Teachers

Task Analysis Framework

This framework is intended to help teachers better critique and develop tasks aimed at promoting students' development of conceptual understanding of mathematics through reflection and communication (Hiebert et al., 1997), as well as through using and connecting mathematical representations (NCTM, 2014). Descriptions below are not necessarily in a hierarchical ordering nor are they mutually exclusive.

Portions of the table below are adapted from Trocki (2014) and Sinclair (2003).

Affordances	Descriptions
N/A	Task is primarily a technology task with no focus on mathematics.
N/A	Virtual manipulative does not have mathematical fidelity required to respond to the prompts.
A	Task prompts students to recall a mathematical fact, rule, formula, or definition.
B	Task prompts students to report information from the virtual manipulative or consider mathematical concepts, processes, or relationships in the current display. The student is not expected to provide an explanation.
C	Task provides opportunities for students to explain the mathematical concepts, processes, or relationships in the current display.
D	Task provides opportunities for students to make predictions and then test their predictions using the virtual manipulative.
E	Task provides opportunities for students to connect multiple representations of a mathematical concept (e.g., graphical, algebraic, and tabular representations of a relation).
F	Task provides opportunities to check students' understanding of mathematical concepts, processes, or relationships. Task may provide minimal feedback to the student based on specific errors.
G	Task provides opportunities for students to go beyond the current display by considering multiple examples to generalize mathematical concepts, processes, or relationships.
H	Task supports students' exploration through manipulation of the display that may surprise one exploring the relationships represented or cause one to refine thinking based on themes within the surprise (e.g., addressing a common student misconception).

Hiebert, J., Carpenter, T. P., Fennema, E., Fuson, K. C., Wearne, D., Murray, H., Olivier, A., & Human, P. (1997). *Making sense: Teaching and learning mathematics with understanding*. Heinemann.

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Sinclair, M. P. (2003). Some implications of the results of a case study for the design of pre-constructed, dynamic geometry sketches and accompanying materials. *Educational Studies in Mathematics, 52*, 289-317.

Trocki, A. (2014). Evaluating and writing dynamic geometry tasks. *Mathematics Teacher, 107*(9), 701-705.