TPACK Levels Rubric 2.0 - mathematics

	Recognizing (1)	Accepting (2)	Adapting (3)	Exploring (4)	Advancing (5)
Overarching conception	• Teacher uses instructional technology for motivation only rather than subject matter development. New ideas are presented by the teacher mostly without technology. • Technology-based activities do not include inquiry tasks. Technology procedures do not provide space for students to use or make connections.	• Teacher uses instructional technology for subject matter development. However, a larger part of technology use is for teacher's demonstrations, which include presentation of new knowledge. • Technology-based activities include confirmation inquiry tasks. Technology procedures, do not provide space for students to use or make connections.	• Teacher uses instructional technology as a way to enhance student learning. This use of technology supports subject matter development. • Technology-based activities include structured inquiry tasks towards intended ideas. Technology procedures concentrate on mathematical tasks that use or make connections.	• Teacher plans for instructional technology to be used mostly by students who explore and experiment with technology for subject matter development. • Technology-based activities include guided inquiry tasks of high cognitive demand. Technology procedures concentrate on doing mathematics while using or making connections.	• Teacher develops instructional technology tasks for students that provide them with deeper conceptual understanding of subject matter. • Technology-based activities include open inquiry tasks of high cognitive demand. Technology procedures concentrate on tasks that use or develop deep mathematical knowledge representing connections and strategic knowledge.
Knowledge of student understanding	• Teacher uses instructional technology in a way that does not support student thinking and learning of new content. • Digital materials only provide space for student practice and drills.	• Teacher uses instructional technology in a teacher-led student-follow format without focusing on students' thinking. • Digital materials for students mirror the structure of the traditional textbook presentation of mathematics.	• Teacher structures students' use of instructional technology to promote student thinking of mathematics. • Digital materials provide an environment for students to engage in active explorations of mathematics with teacher guidance.	• Teacher facilitates students' use of instructional technology to develop thinking leading to conceptual understanding of mathematics. • Digital materials provide an environment for students to deliberately take mathematically meaningful actions on mathematical objects, but the teacher still guides students to see the meaningful consequences of those actions.	• Teacher facilitates students' use of instructional technology to develop higher order thinking leading to deep understanding of mathematics. • Digital materials provide an environment for students to deliberately take mathematically meaningful actions on mathematical objects and to immediately see the meaningful consequences of those actions.

Knowledge of curriculum	• Teacher selects instructional technology that is not aligned with curriculum topics. • Students' tasks with technology do not support making connections between topics in the curriculum.	• Teacher selects instructional technology that is partially aligned with one or more curriculum topics. Technology use is not effective for the curriculum topics. • Students' tasks with technology do not support making connections between topics in the curriculum.	• Teacher selects instructional technology that is aligned with curriculum topics, but only replaces non-technology-based tasks with technology-based tasks. Technology use is partially effective for the curriculum topics. • Students are given curriculum-based tasks with technology to develop a basic understanding of curriculum topics with teacher guidance.	• Teacher selects instructional technology that is aligned with curriculum topics, and provides an alternative way of topic exploration. Technology use is effective for the curriculum topics. • Students are given curriculum-based tasks with technology and are asked to expand mathematics ideas on the basis of technology explorations.	• Teacher selects instructional technology that is aligned with curriculum topics, but also challenges the traditional curriculum by engaging students in learning different topics with technology. Technology use is highly effective for the curriculum topics. • Students' tasks with technology focus on deepening understanding of mathematics concepts, and making connections between topics in and out of the curriculum.
Instructional strategies	• Teacher focuses on how to use instructional technology rather than on mathematics ideas. • Digital materials are built around drill and practice only.	• Teacher structures lessons without student explorations with instructional technology. The instruction is teacher-led. • Digital materials are built around delivery of information as well as drill and practice.	• Teacher uses a deductive approach to teaching with instructional technology to maintain control of the progression of the exploration activities. • Digital materials are built around mathematical objects but do not promote student reflection.	• Teacher uses deductive and inductive instructional strategies that support students' thinking about mathematics. • Digital materials are built around mathematical objects and explicitly promote student reflection, especially the posing of questions for sense-making.	• Teacher mostly uses multiple inductive instructional strategies that support students' experimentation of mathematics ideas with instructional technology. • Digital materials are built around mathematical objects and explicitly promote student reflection - especially the posing of questions for sense-making and reasoning, including explanation and justification.