Hello. Welcome to the first in a series of brief videos describing one component of the I-SMART enhanced assessment grant research project, in which we designed and evaluated a set of scenario-based science tasks with deeper application of universal design for learning principles. I'm Bob Dolan, senior innovation scientist at CAST. And Kim Ducharme and I will be your guides through the videos.

This first video is an introduction describing the project as a whole and will be followed by four other videos with additional details. For now, I'm just going to give you an overview.

The I-SMART project is a multi-state project funded through the US Department of Education's Enhanced Assessment Grant program. And it's focused on developing innovative approaches to science assessments using the principles of evidence-centered design and universal design for learning. This work builds upon existing dynamic learning map, or DLM, efforts in ELA math, and in science.

The team is comprised of a five state consortium led by the state of Maryland and also including New York, New Jersey, Missouri, and Oklahoma, with research efforts led by the University of Kansas' ATLAS team and CAST with BYC Consulting providing evaluation.

Within the I-SMART project we have Goal 2, which was to design, develop and evaluate learning map model-based assessments that incorporate science disciplinary content and science and engineering practices in highly engaging, universally designed, technology delivered formats. This particular study within Goal 2 has some additional goals. We wanted to co-design and evaluate testlets for what we're calling the secondary population of students. We'll describe those students in a moment. We wanted to develop another set of scenario-based tasks that evaluate a range of depth of knowledge with a deeper application of UDL principles and a greater emphasis on the formative use of these instructional embedded tasks.

So, what do I mean by secondary population? Much of the rest of the I-SMART project is focused on students with the most significant cognitive disabilities. In this effort, and in some other efforts within I-SMART, we're focusing on students who are struggling to meet grade level expectations in science, but who do not have significant cognitive disabilities. In fact, these students may or may not have any identified disabilities. As with the rest of I-SMART, we're looking across elementary, middle, and high schools.

We have three overarching research questions in this component of the project. First, do students understand how to interact with these new and sometimes complex item types? Second, did students make effective use of explicit and implicit choice opportunities that we provided them? And finally, were we able to the design a task that assessed a range of depth of knowledges?

So, what do we mean by deeper application of universal design for learning? We wanted to provide students with multiple means to demonstrate their construct relevant knowledge, skills, and understandings, of course, but we wanted to go deeper in providing them with choice of how to respond. We also wanted to provide them with multiple means of engaging in the task and with the information provided.

Also, we engaged in an iterative co-design process with students, which Kim will describe in the next video, and use their expertise as, quote unquote, expert learners as described in the bottom line of universal design for learning.

When we talk about formative use of testlets, we mean true formative assessment as an instructional process. We wanted to provide students the ability to demonstrate independently their knowledge, skills and understandings of basic depth of knowledge. So basic applications tied directly to the EE nodes described in the learning map models. We also wanted to provide them the opportunity to demonstrate higher order depth of knowledge. In other words, strategic and extended thinking beyond the essential elements. And we also are playing with providing students immediate feedback to support self-reflection, especially on the more basic depth of knowledge items.

The research process we engaged with was, as I'd said, the co-design of these testlets with students. Based on these designs, we developed a prototype, students used these prototypes in think aloud studies, which were followed by interviews. And then we did our analysis. Again, these are going to be detailed in the upcoming videos, but I'll just give you a little bit of a taste right now.

The co-design process focused on giving students agency, giving them a say, giving them a voice in how they wanted to demonstrate what they know and can do. We invited students to provide broad ranging feedback and out of the box thinking. And the idea here was to make, and the process of this co-design was to make thinking and learning visible for everyone. Designers, researchers, and the students.

The prototype itself was designed to be a standalone, but only to be used within the context of the think alouds. So, we could really understand other students, not the co-designing students, but another set of students impressions with it.

We developed three testlets, one for elementary, one for middle, one for high school, aligned with these three NGSS standards. These are links. If you want to take a look at these prototypes, feel free to do so.

And then we conducted a think aloud study. These were done as single, one-on-one sessions with six middle school students who were struggling in science. As I said, there was a think aloud component where they spoke aloud what they were thinking as they went through the testlet, and then we followed out with an interview, which was semi-structured. These were conducted remotely through Zoom and recorded for post-hoc analysis.

The analysis consisted of informal coding of what they said and what they did during both the think aloud and interview portions. We also played with this visual analysis, this diagram, which we'll talk about more later in one of the subsequent videos, to depict their interactions and behaviors while working with the testlets. And also, a comparison of basic and higher order depth of knowledge scores.

In a nutshell, just to give you a little teaser, our findings, do students understand how to interact with new item types? By and large, yes. Quite readily in fact. Did they make effective, explicit, and implicit choices? Well, in terms of explicit choices, in terms of engagement and accessing prior knowledge, we believe they did. But in terms of the implicit choices, specifically on the use of the embedded supports and the multiple ways of providing their responses, no. Largely they did not. Did the task assess a range of depth of knowledge? We have limited evidence here, but we think that we did. We were able to give students an opportunity to independently demonstrate both basic and higher order depth of knowledge.

Again, we're going to be providing much more detail on these in subsequent videos. Next up, the second video will be Kim about testlet co-design. Thank you.