Welcome to Video Three in the I-SMART Goal 2 series. My name is Kim Ducharme. I will be walking you through the Testlet prototypes. As a reminder, Goal 2 of I-SMART is to design, develop and evaluate assessments in an engaging and universally designed and technology-delivered format.

We explored innovative approaches to science assessments using the principles of universal design to empower students to better demonstrate their learning. For example, we engaged learners with authentic scenarios, supported exploration of food chains, webs and causality through modeling and storyboarding, supported collection of evidence and deep thinking with pros and cons, and finally, we scaffolded and evaluated students' evidence-based argumentation and collected evidence of their basic and higher-order knowledge, skills, and understandings, or KSUs.

Here, we support them in making a claim to the governor, using evidence from their work to support it. Here you see support for using the food web to build evidence. When finished, the student can send their advice to the governor.

Now you're going to see a prototype of middle school, plus a few key screens from the elementary and high-school prototypes. You can also use these links to explore them on your own. With the middle-school prototype you're about to see, we explore the use of models, food chains and webs to identify producers and consumers in aquatic and terrestrial ecosystems. The assessment design focused on these target nodes. Note that we didn't evaluate Node Two, as it would've made the scenario too complex.

We begin with tutorial screens. This helps minimize threats in the assessment experience by getting students comfortable and familiar with the environment and multiple modes available to them.

Welcome to EcoSim. You are about to go on a journey as a scientist.

Speech to text. Let's begin. Hint. And glossary. The core experience starts with an authentic scenario providing expert advice as an ecologist, and the element of choice: something local and familiar or more exotic.

Welcome to the ocean ecosystem. It may not look like much is living there but jump in to see some plants and animals that live there.

Once on their journey, the clipboard feature offers students a means for capturing their thinking: pros and cons. After each learning segment, the student sees interim screens inviting them to add more to their pros and cons clipboard, and an orienting preview to remind of the goal of the activity: helping the governor decide whether or not to make a law to protect coyotes.

Now the student begins to construct a model to describe relationships through a food web. They start with building an understanding of energy flow. This serves as a reminder for some and a background-knowledge builder for others. Feedback is offered along the way for correct and incorrect answers. We capture their initial responses for scoring their basic knowledge, skills, and understandings.

The food web is constructed one row at a time, starting with producers. Students then work through the first, second and third level consumers. Students are iteratively provided with feedback and multiple attempts so that they end up with a correct food web, which they can use in building their final argument.

(Silence).

Students then have the opportunity to iteratively build an additional model of relationships that focuses on cause-and-effect relationships through a storyboard narrative. The food-web model is close at hand for reference.

(Silence).

Students work through each step to construct that narrative. After each core experience, they are prompted to revisit their clipboard to revise and build upon former pros and cons.

The student arrives at the final claim and evidence screen with their work products shown on the left. They must make a claim to the governor and use at least one piece of evidence for their work to support it.

This student is using their pros and cons clipboard. When finished, they send their advice to the governor. They receive a letter from the governor in return, thanking them and giving them a clear sense of the impact of their expert advice. We designed this experience to provide the student with an engaging experience and an authentic taste for what an ecologist might do in their career.

We explored similar design strategies for the elementary school Testlet, where students were to create and use food-chain models to trace matter from the environment to plants through living things and back to the soil. Here are the elementary school target nodes.

The learning was situated in a scenario involving a fallen tree, and the student was asked to think like an ecologist and tasked with advising the school principal on whether or not to remove the tree, starting with considering the pros and cons.

For this prototype, we provided more cognitive scaffolding and decreased task complexity than we did for the middle school students. Here, the student considered the ecosystem cycle through the life of a tree and is supported with feedback along the way. Then they were supported to construct a food-web model to consider the flow of nutrients in the ecosystem.

Finally, the student arrives at the final claim and evidence screen with their work product shown on the left. They must now make a claim to the school principal and use evidence from their work to support it. Just as in the middle-school prototype, they send their advice to the principal and receive a letter thanking them and giving a clear sense of the role an ecologist might play in this potentially impactful decision.

We explored similar and new design strategies for the high-school Testlet, where students were to explain changes in population or carrying capacity with multiple causes and effects and using graphical representations. Here are the high-school target nodes. Students again choose their ecosystem, got situated in the problem at hand and considered pros and cons. They spent time completing a food web to renew their background knowledge, this time with an emphasis on

both simple and complex causal reasoning. After each piece of model-building, the student was prompted to describe the effect in the form of a knowledge statement.

Next, students build a storyboard and population graph as additional ways to model the phenomena. As with other tasks, we collected their initial responses as evidence of the basic KSUs, then scaffold them in relating different representations of elements of the model. Each step of the way, they build on the population graph.

This multiple-select task evaluates whether the student can identify factors that affect carrying capacity of an ecosystem. And finally, students use their work products to make a considered claim and support it with evidence.

Next up, Bob Dolan will walk you through the Think-aloud study.