Using Learning Map Models to Design Accessible Assessments

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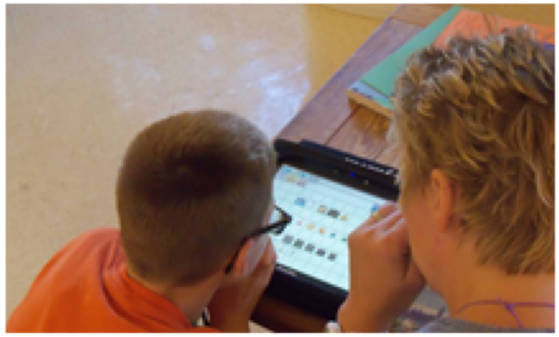


Challenge

- To provide science assessments for students with significant cognitive disabilities
  - Linked to grade-level standards and
  - Accessible to students who may have
    - Severe or multiple disabilities
    - Sensory Barriers
    - Communication Barriers

Framework

- **Learning Map Models**
  - Cognitive models that are fine-grained representations of the knowledge, skills, and understandings required to reach a learning target, which have interconnected, multiple pathways. (Bechard et al., 2012; Kingston et al., 2017)

- **Universal Design for Learning**
  - Guidelines for creating assessments that are accessible to all learners (CAST, 2018; Rose & Meyer, 2000)

- **Evidence-Centered Design**
  - Conceptual model for assessment design that integrates UDL guidelines (DeBarger et al., 2011; Mislevy et al., 1999)

Approaches to Accessible Assessments

Traditional

- Same assessment targets for all students
- Retrofitting makes materials accessible

DLM & I-SMART

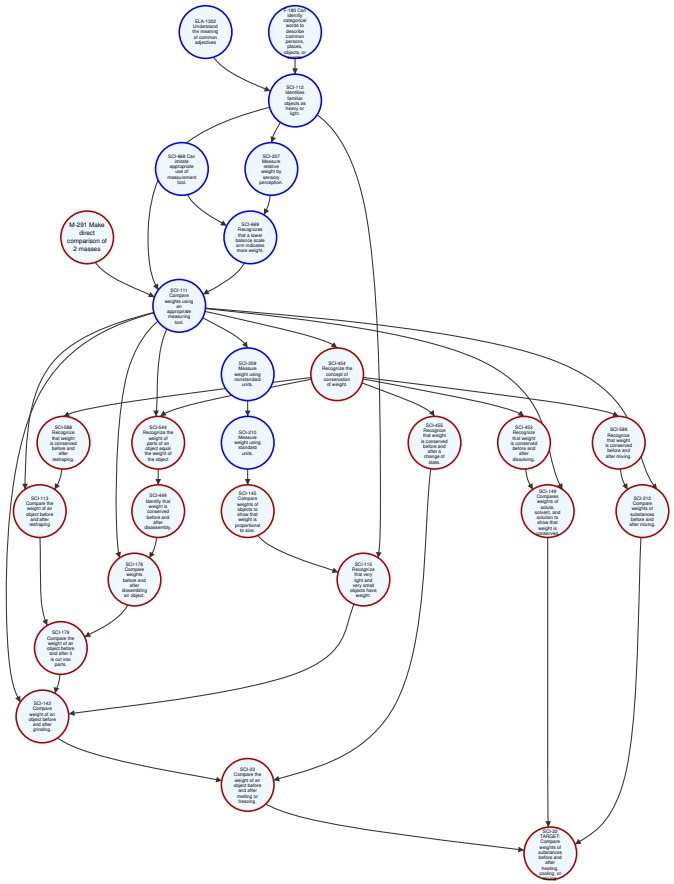
- Variable targets matched to student profile
- Materials are accessible by design

(Dynamic Learning Maps, 2016)

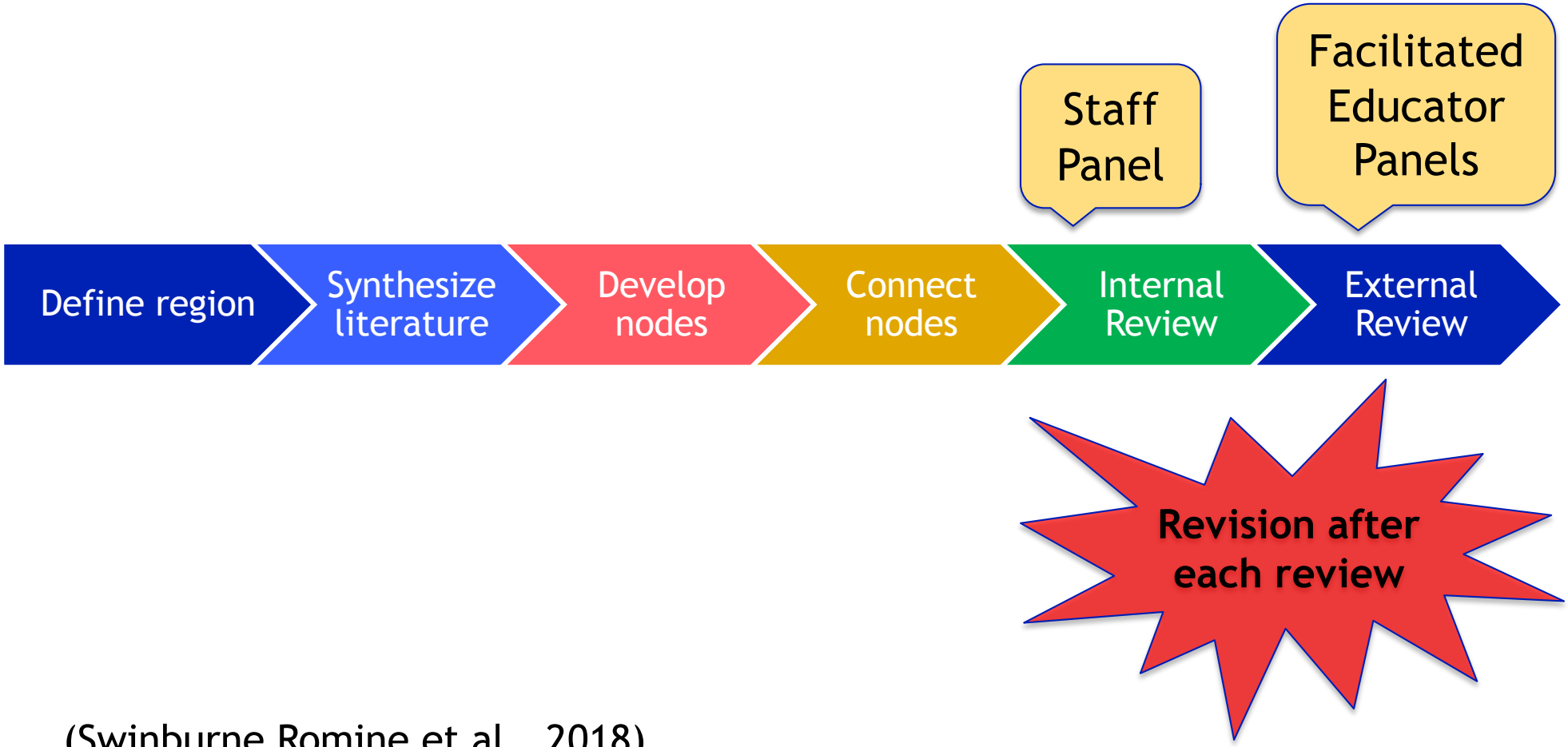
Learning Map Models

We used the UDL guidelines when developing the **design principles** and **stakeholder review criteria** for I-SMART maps.

(Andersen et al., 2019; Swinburne Romine et al., 2018).



Development Process

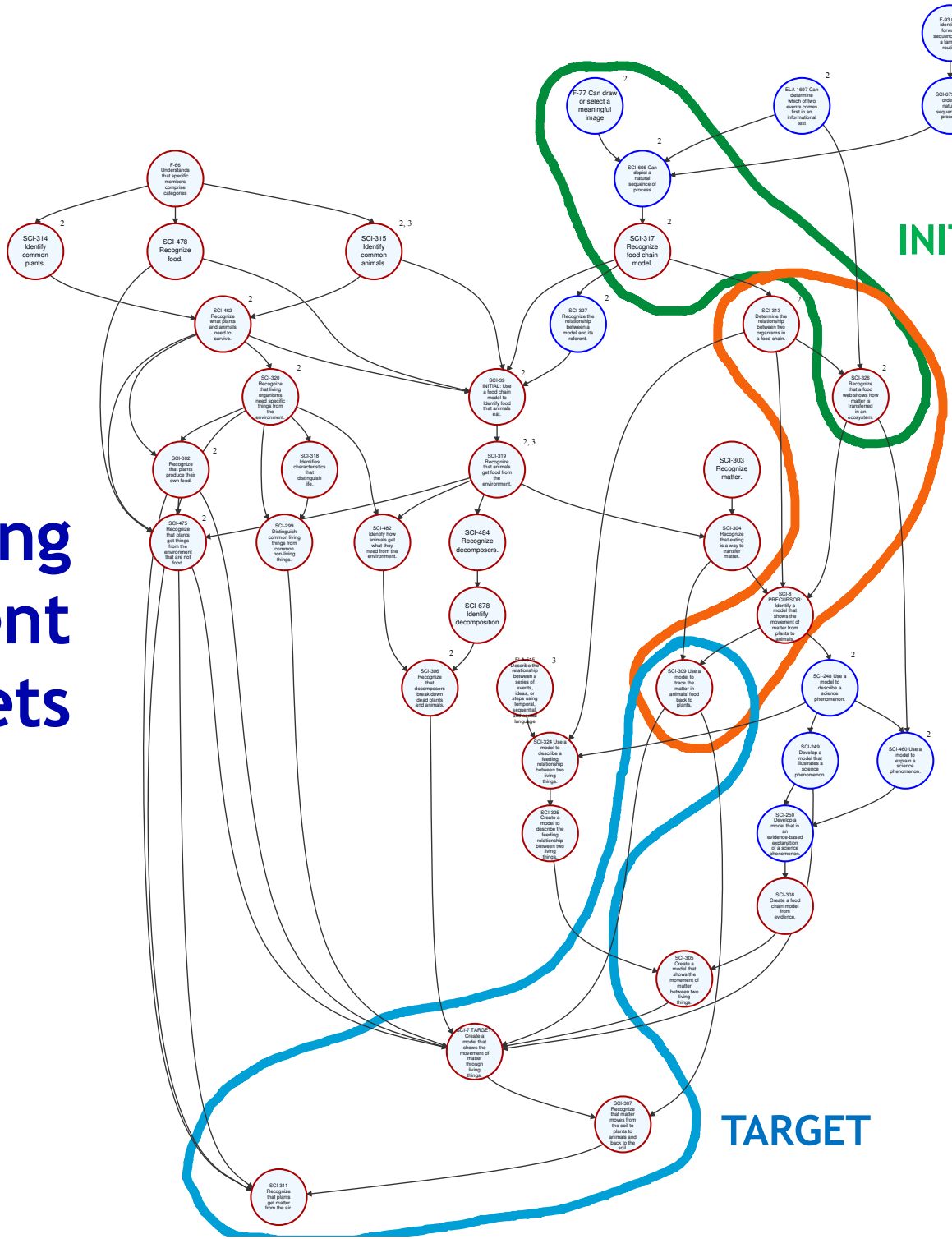


(Swinburne Romine et al., 2018)

Identifying Assessment Targets

- We used the LM structure to select multiple groups of nodes as assessment targets that span the LM from beginning to end
- Guidelines for linkage levels
  - Includes DCI and SEP
  - Different complexity
  - Provides wide range of access
  - One direct connection
  - Adjacent levels overlap

Varying assessment targets



Linkage Levels

(ATLAS, 2018)

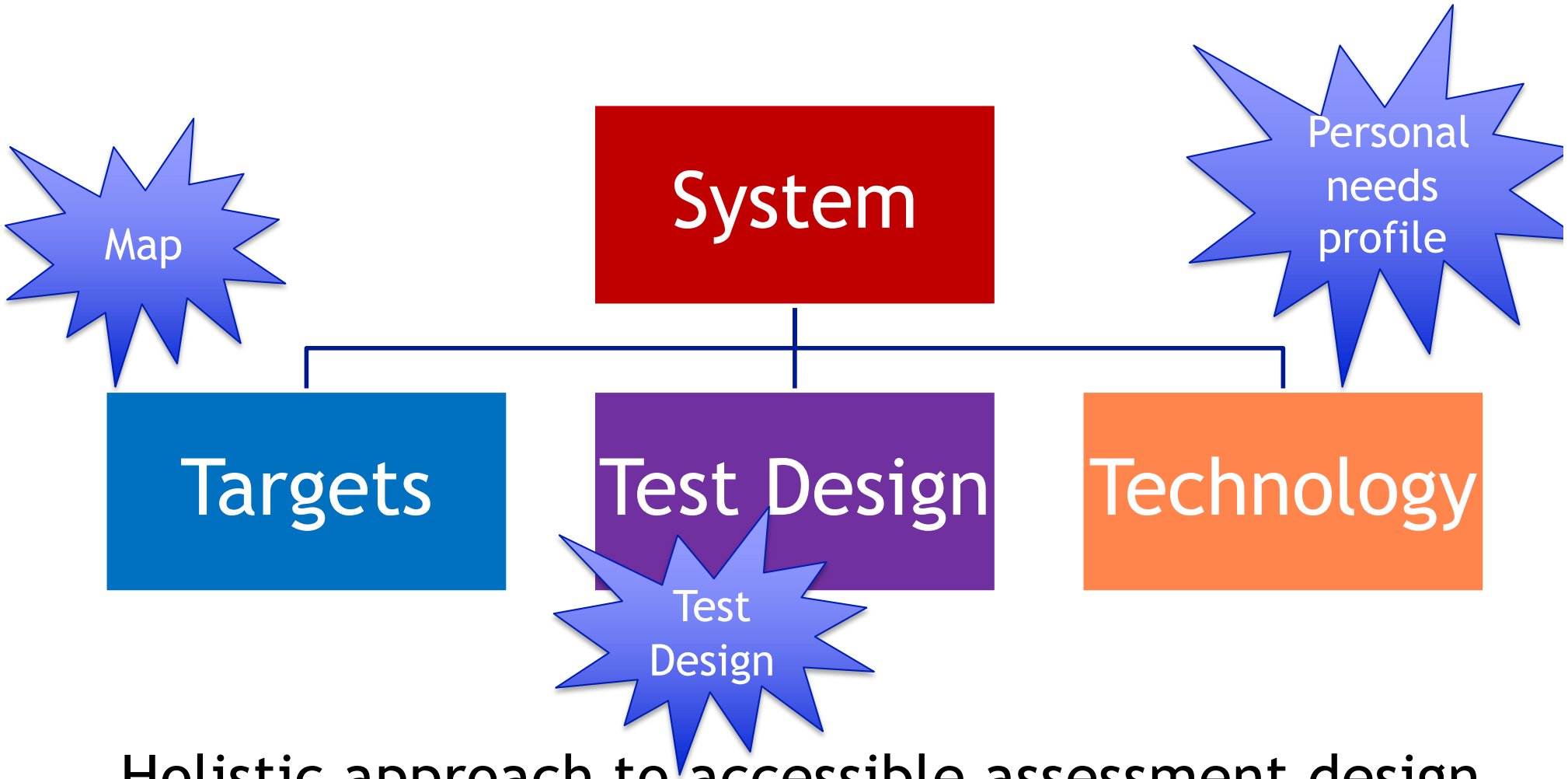
Linkage levels provide access

(Andersen et al., 2019)

EE.5.LS2-1 Create a model that shows the movement of matter through living things.

Initial LL	Precursor LL	Target LL
F-77 Can draw or select a meaningful image	**SCI-326 Recognize that a food web shows how matter is transferred in an ecosystem**	**SCI-309 Use a model to trace the matter in animals' food back to plants**
SCI-666 Can depict a natural sequence or process	SCI-313 Determine the relationship between two organisms in a food chain	SCI-7 Create a model that shows the movement of matter through living things
SCI-317 Recognize food chain model	SCI-8 Identify a model that shows the movement of matter from plants to animals	SCI-307 Recognize that matter moves from the soil to plants to animals and back to the soil
SCI-326 Recognize that a food web shows how matter is transferred in an ecosystem	**SCI-309 Use a model to trace the matter in animals' food back to plants**	SCI-311 Recognize that plants get matter from air

Systematic Approach to Universal Design



Holistic approach to accessible assessment design

UDL in an Evidence-Centered Design Framework

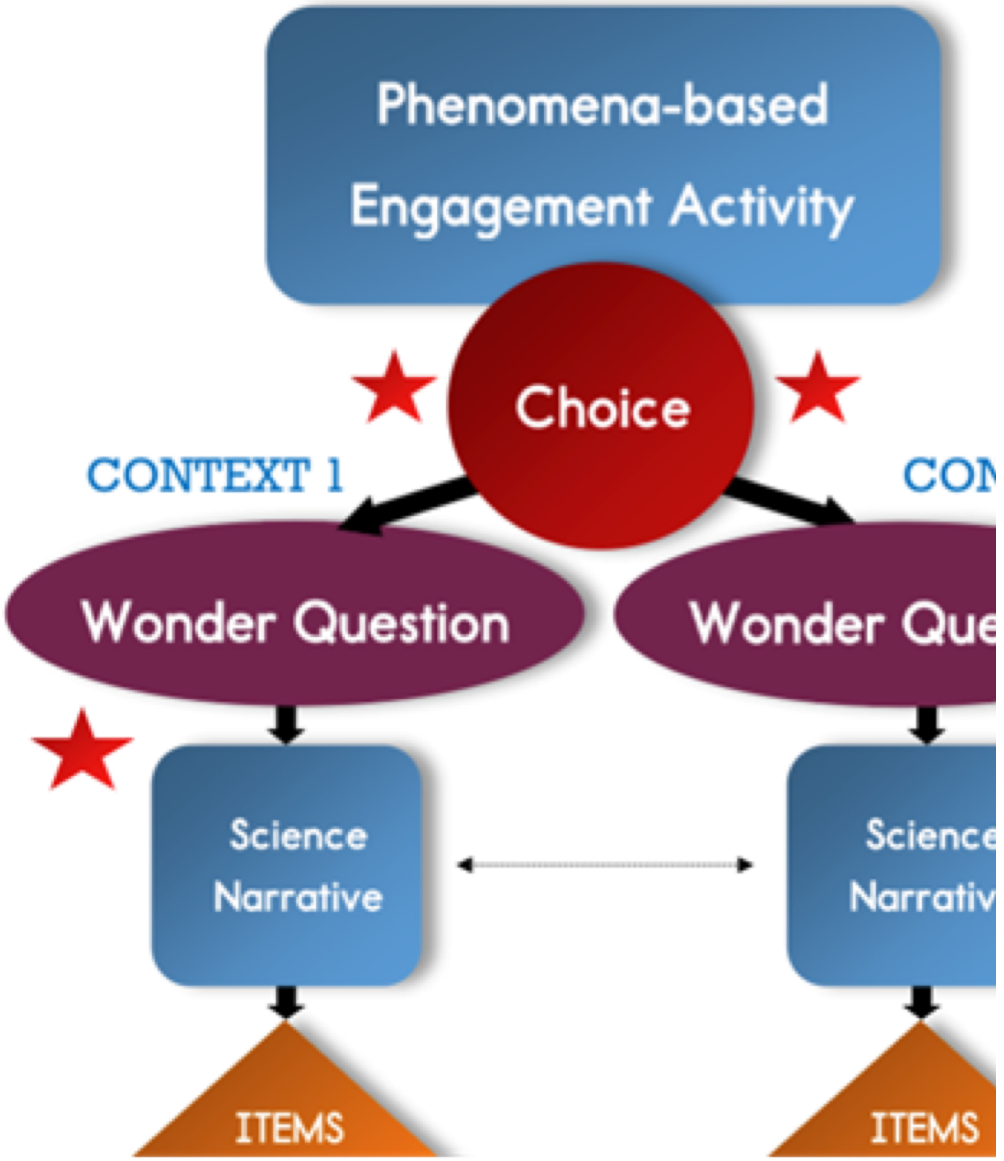
- **Essential Element Concept Map** is a document that specifies the connection between the **content**, a testlet's **design elements**, and student **observations**

- Provides guidance to item-writers in developing testlets and incorporating UDL options.

  (DLM, 2016)

I-SMART Testlets

- Phenomena-based
- Student Choice
- Wonder Questions
- Science Narratives
- Embedded Items

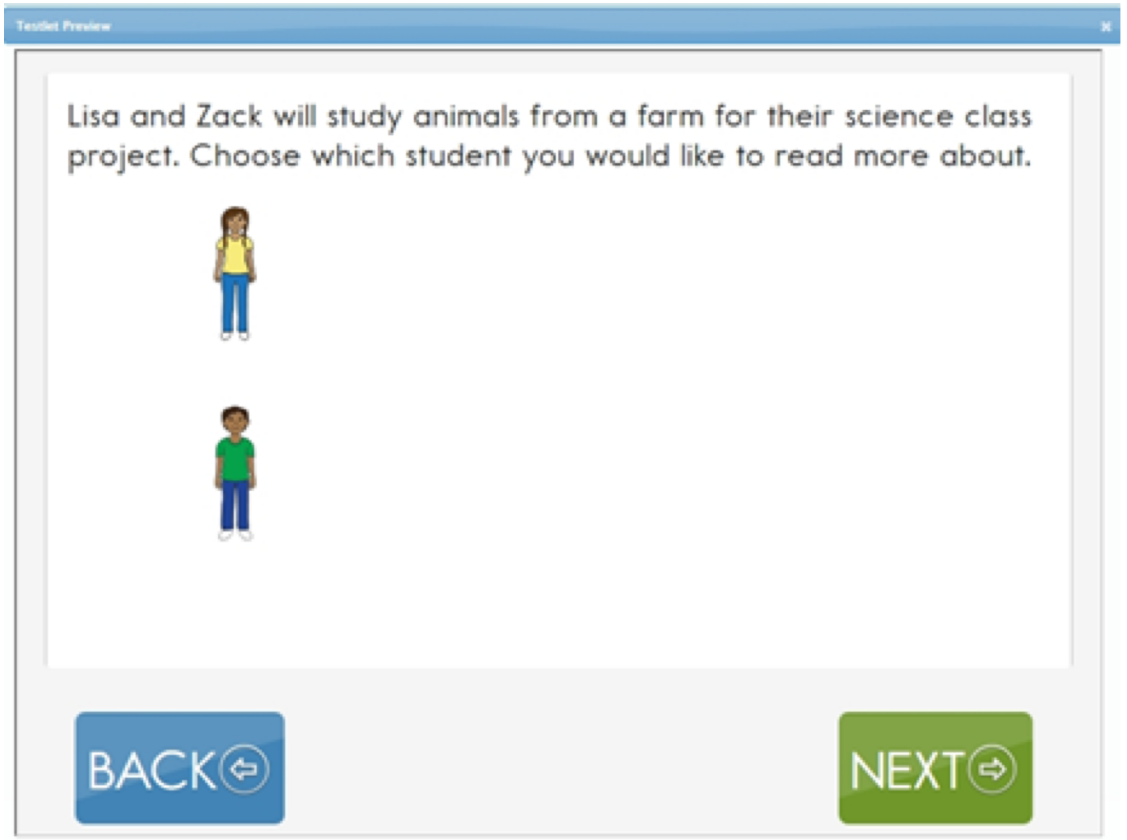


Examples of UDL Features

- Engaging science phenomena
- Wonder Questions
- Student choice of context for assessment
- Self-evaluation questions
- Innovative Item Types

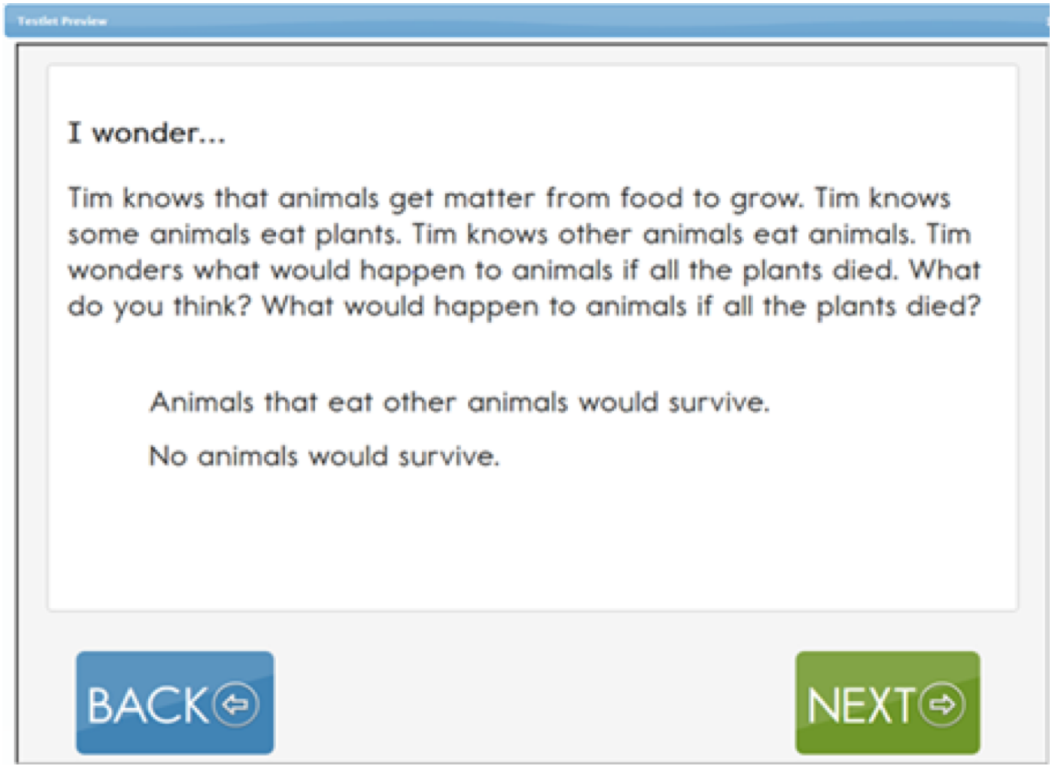
Choice of Context

- Provides an option for recruiting interest
- Found at the beginning of the testlet
- Unscored



Wonder Question

- Provides option for self-regulation
- Found near the beginning of the testlet
- Unscored
- Students return to wonder question at end of testlet



Thank You

- https://ismart.works/
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