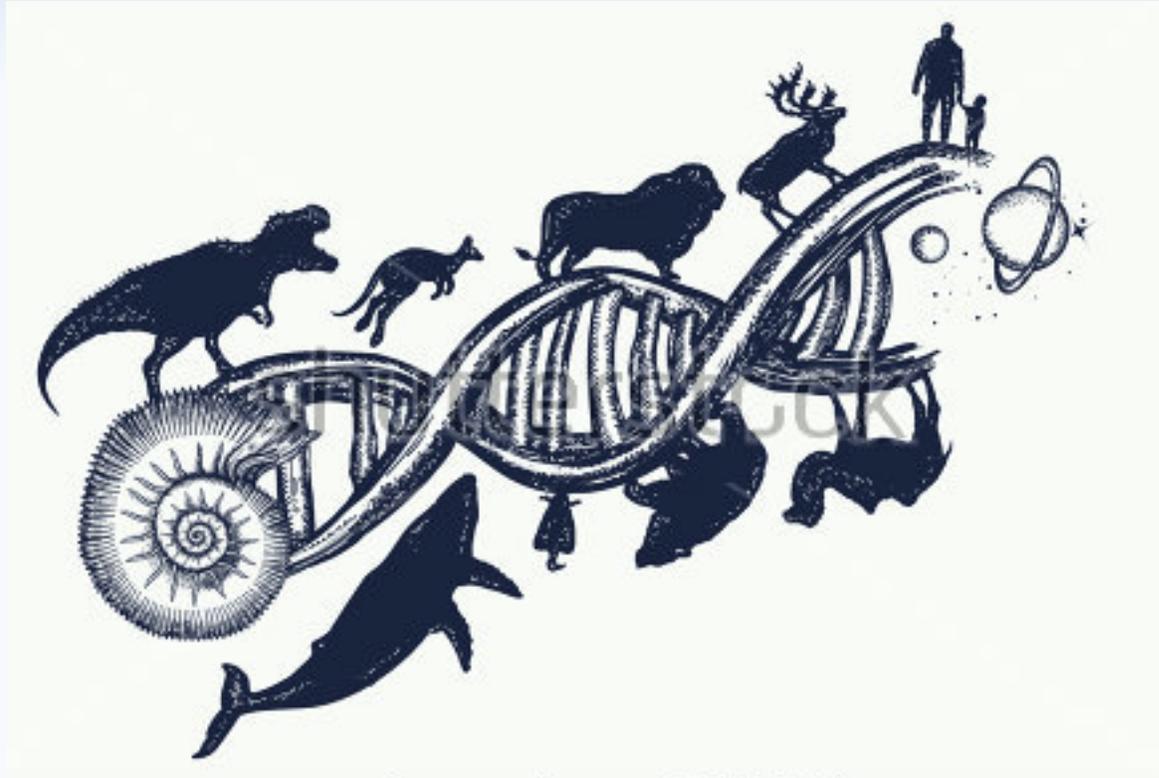


# **Formative Assessment Grounded in Disciplinary Learning**

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Phoenix AZ  
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# Rooted in the Disciplines

Formative assessment practices must be developed that are deeply rooted within the specific disciplines in which they are to be carried out.

(Andrade, Bennett, & Cizek,  
forthcoming)



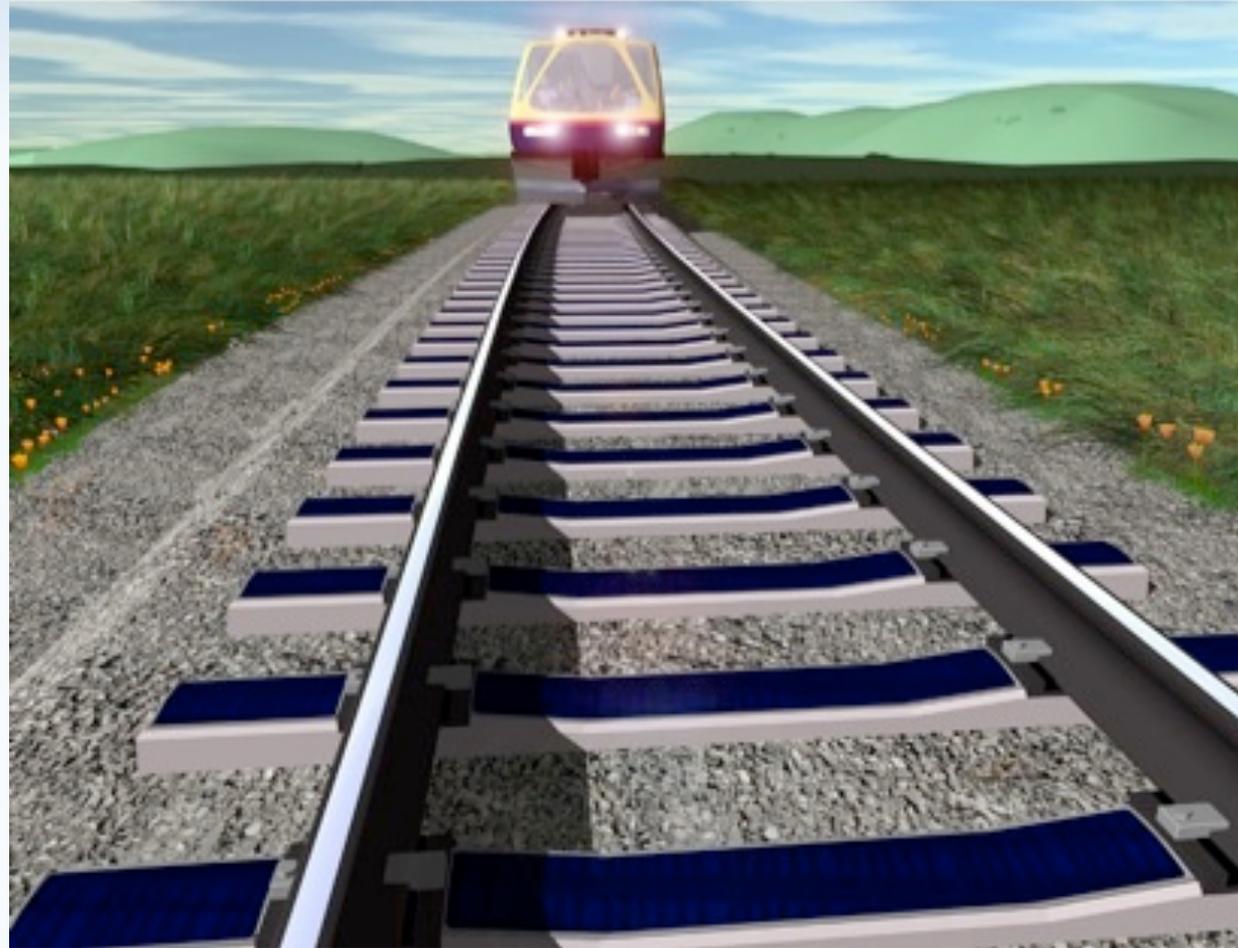
# Overview

- Recap on Formative Assessment
- Disciplinary Learning
- Formative Assessment and Disciplinary Knowledge
- “Reform” Teaching, Disciplinary Knowledge and Formative Assessment
- Role of Leaders

# **Recap on Formative Assessment**

- ✓ Formative assessment is the term used to describe a type of assessment where the focus is on ***informing*** learning, rather than measuring it or summing it up
- ✓ Assessment that focuses on the learning ***as it is taking place***
- ✓ Purpose is to ***move learning forward*** from its ***current status***
- ✓ ***Ample evidence that formative assessment improves learning***

# Keeping Learning on Track to Intended Goals





**Evidence:  
Qualitative insights  
along the way**

**Respond to learning  
as it is unfolding**

# Formative Assessment Practices



- 1 Clear learning goals & success criteria
- 2 Eliciting and interpreting evidence of learning while it is developing
- 3 Immediate and near-immediate evidence-based responses
- 4 Feedback to students
- 5 Student involvement – peer feedback and self-assessment

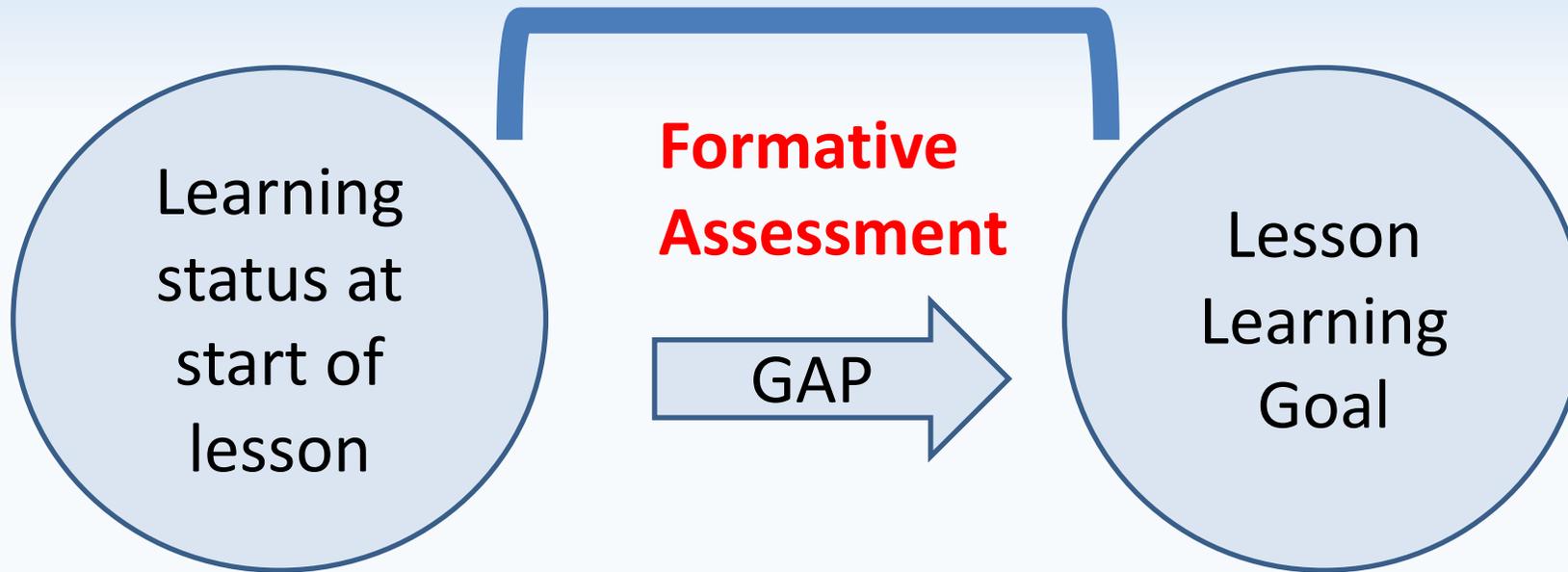
# Guiding Questions

- Where am I going?
- Where am I now?
- Where to next?

Close the gap

*Sadler, 1989*





## Formative Assessment is...

- **Intentionally** obtaining evidence in the course of continuous teaching and learning through observation, discussion, questioning, and review and analysis of tasks/work

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- gauging how student learning is progressing **while** students are in the process of learning

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- using evidence to inform immediate or near-immediate teaching and learning

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- providing ongoing descriptive feedback to learners

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- involving students in the assessment process through peer and self-assessment

## Formative Assessment is not...

- giving a test at the end of an instructional cycle or on a predetermined basis (e.g., quarterly, annually)

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- evaluating student achievement at the end of a sequence of learning

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- using test data to make decisions about medium- and long-term goals

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- assigning grades/reporting achievement

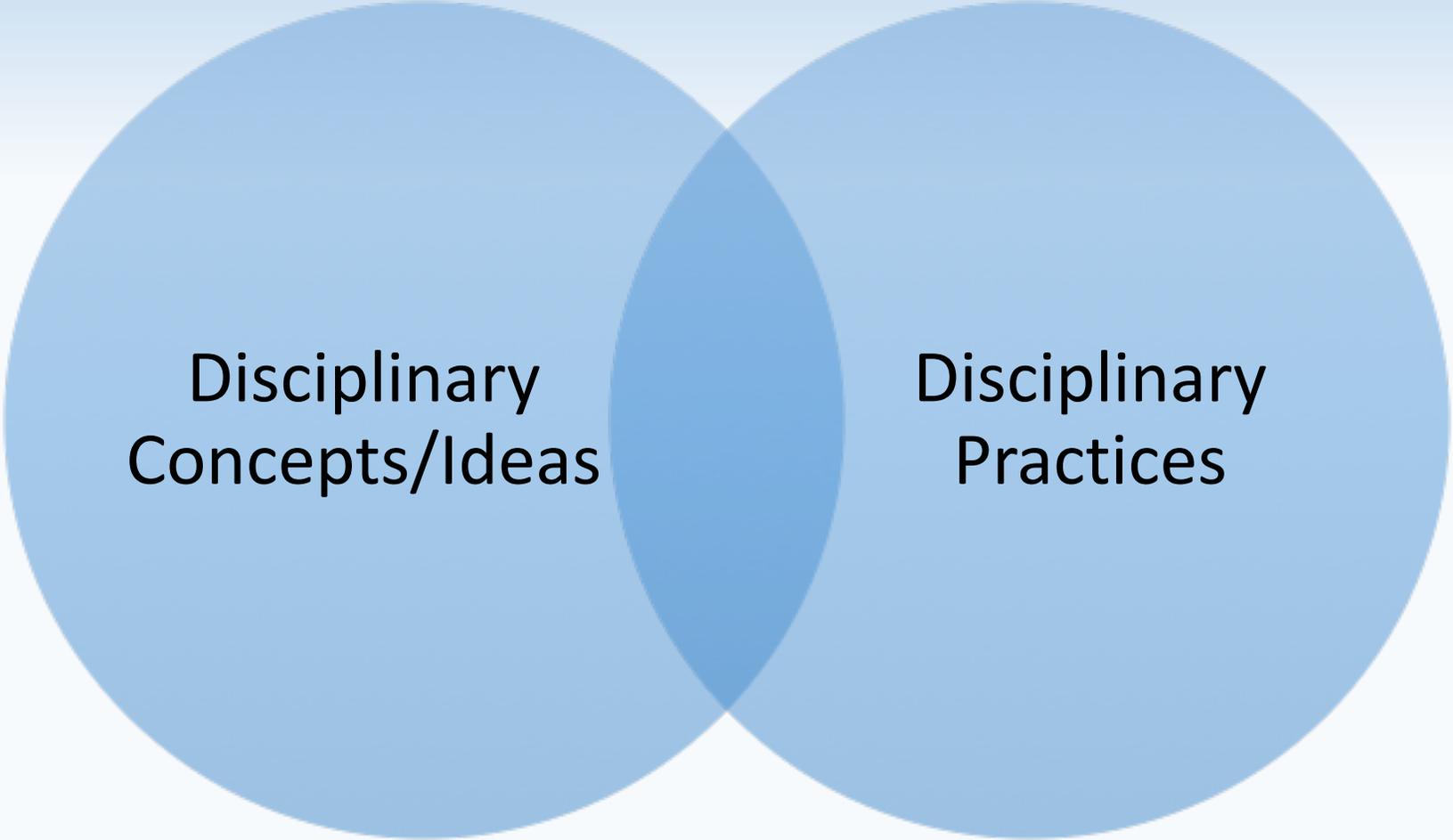
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- telling students the results of a test

Formative assessment promotes the goals of lifelong learning, including higher levels of student achievement, greater equity of student outcomes, and improved learning to learn skills (OECD, 2008).



# **Disciplinary Learning**

A Venn diagram consisting of two overlapping circles. The left circle is labeled 'Disciplinary Concepts/Ideas' and the right circle is labeled 'Disciplinary Practices'. The overlapping area in the center is shaded a darker blue than the individual circles.

Disciplinary  
Concepts/Ideas

Disciplinary  
Practices

# Disciplinary Learning

- Teaching learning strategies (e.g., critical thinking) out of context is unlikely to develop a generic skill applicable to many subjects
- Mathematics proof - critical thinking: ensuring that each step follows from the previous one
- Historical account – critical thinking: considering the author of the account, the potential biases and limitations that the author may be bringing to the account

# Teacher Knowledge: InTASC, 2011

- **Know how learning occurs** and how to use instructional strategies that promote student learning
- **Understand major concepts, assumptions, debates, processes of inquiry, and ways of knowing that are central to the discipline(s) s/he teaches**
- **Understand common misconceptions** in learning the discipline

# Disciplinary Knowledge

- Typical pathways that students move along to achieve understanding
- Common difficulties or misconceptions students might encounter

Heritage & Wylie, (in Andrade et al.)



# Teacher Knowledge

**Knowledge**

**Concepts**

**Analytical practices**

**Skills**

**Disciplinary Knowledge**

# Disciplinary Learning: Math

- Conceptual understanding (solution pathways) and procedural fluency
- Justifying and explaining ideas
- Communicating reasoning about concepts
- Engaging in mathematical practices:
  - Constructing viable arguments and critiquing the reasoning of others

# Disciplinary Learning: ELA

- Reading: Engaging with complex texts to build knowledge across the curriculum
- Writing: Using evidence to inform, argue and analyze
- Speaking and Listening: Working collaboratively, understanding multiple perspectives, and presenting ideas

# Disciplinary Learning: Science

- Asking questions (for science) and defining problems (for engineering)
- Constructing explanations (for science) and developing designs (for engineering)
- Engaging in argument from evidence
- Obtaining, evaluating and communicating information
- Developing and using models

# Disciplinary Learning: HSS

- Asking questions and developing a plan to answer those questions
- Applying disciplinary tools most appropriate to the questions (civics, economics, geography, history)
- Gathering and evaluating evidence from a variety of primary and secondary sources
- Communicating conclusions
- Taking informed action

# Teacher Knowledge

**Knowledge**

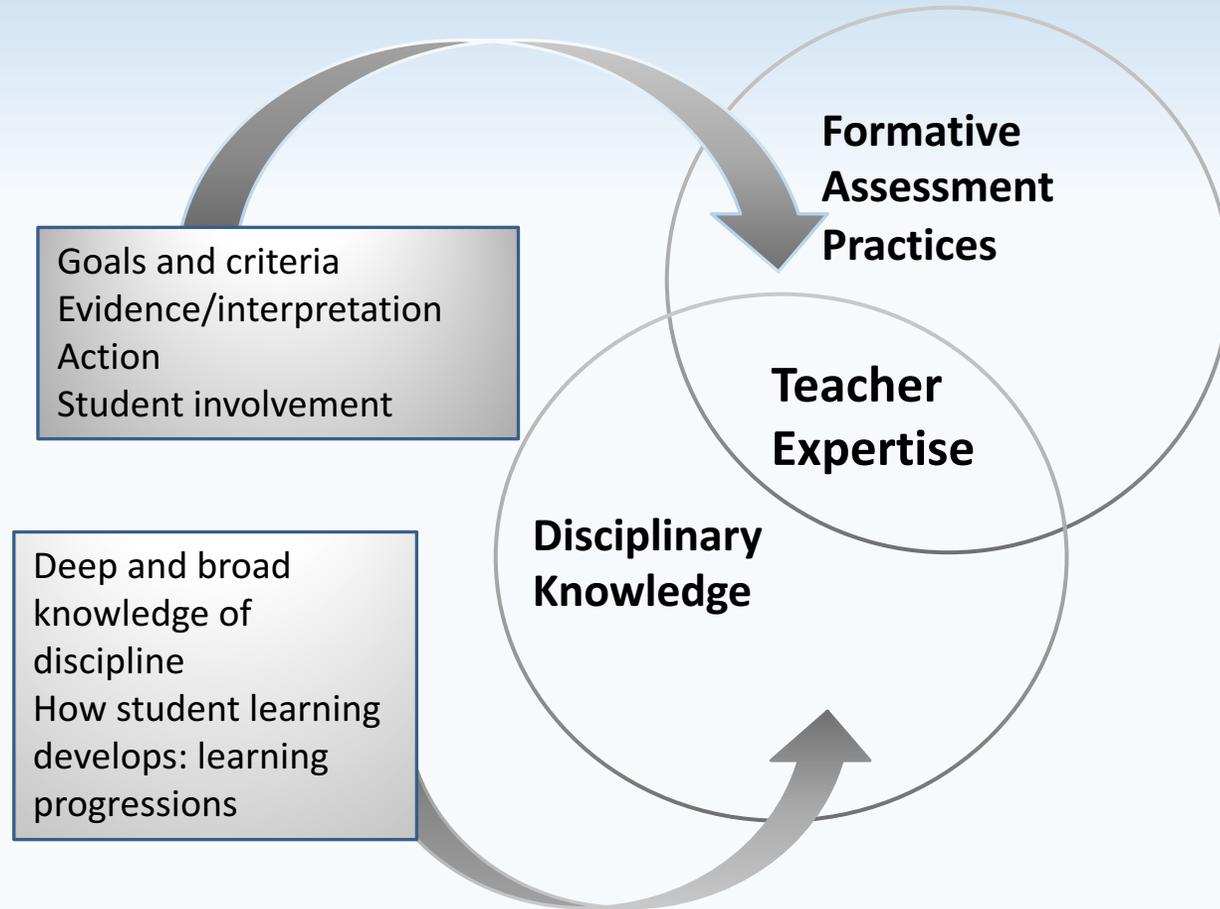
**Concepts**

**Analytical practices**

**Skills**

**Disciplinary Knowledge**

**Formative Assessment  
and  
Disciplinary Knowledge**





1

## Clear learning goals & success criteria

Establish lesson-sized LGs and SCs within a broader progression of learning

Integrate analytical practices into learning goals

Understand what meeting LGs and SCs entail and convey to students



2

Eliciting and interpreting evidence of learning while it is developing

Plan formative opportunities in the lesson

Understand common challenges and misconceptions

Pose questions to explore full range of thinking

Interpret evidence



3

Immediate and near-immediate evidence-based pedagogical responses to learning

Respond to students' ideas

Know what is likely to be an effective pedagogical action

Make connections between and among ideas



4

## Feedback to students

Understand student thinking

Help students recognize

discrepancies between current

status and learning goals and

provide guidance to close the gap

# Formative Assessment Practices



- 5 Student involvement – peer feedback and self-assessment

Focus students on disciplinary ideas

# **“Reform” Teaching, Disciplinary Knowledge and Formative Assessment**

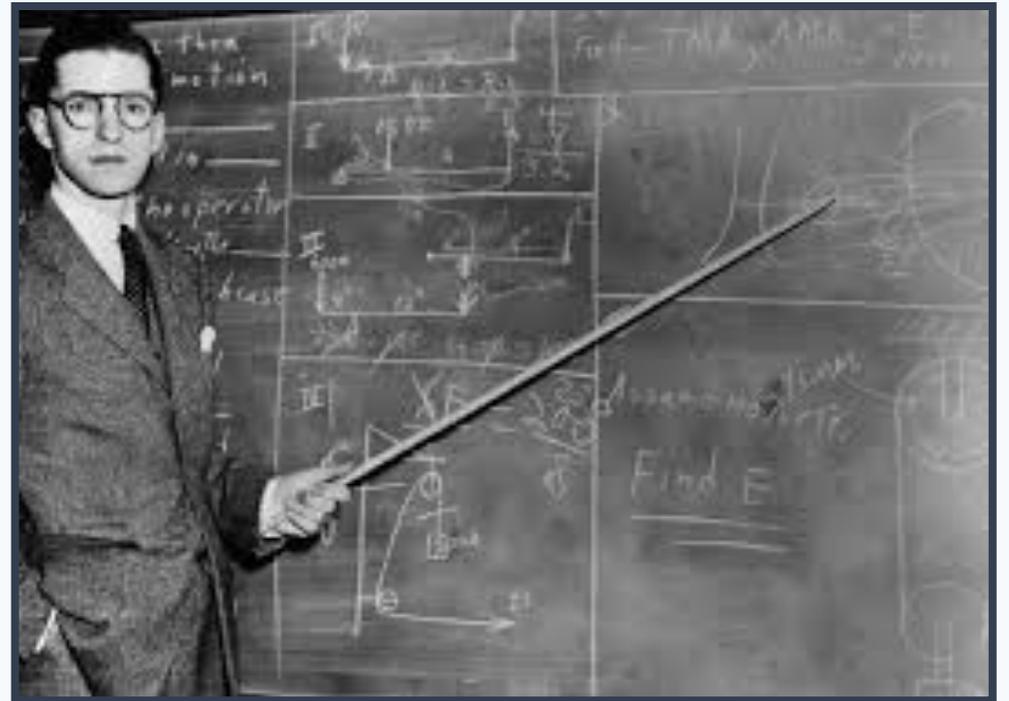
# Familiar?

Teacher talks

Students listen...

...do worksheets

... and take tests

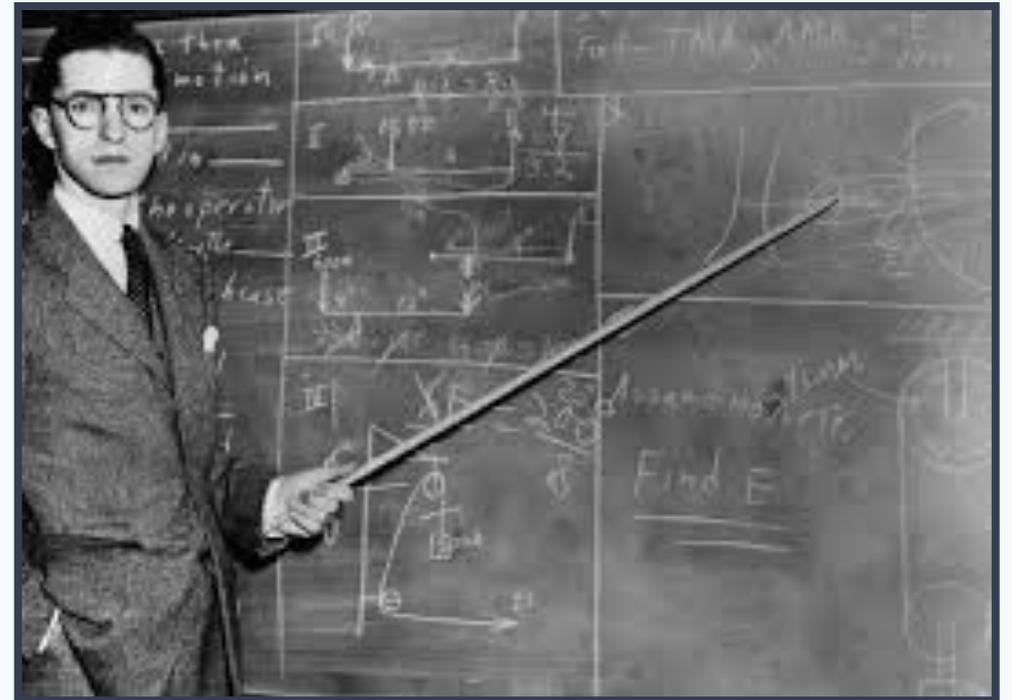


# Traditional Lesson

Detailed, pre-planned lessons according to a fixed curriculum

Sequences of activities

“Remediation” of prescribed concepts



# “Check for Understanding”



**Got it. Didn't Get It. Reteach!**

# “Reform” Teaching

Base instruction on the lesson as it unfolds in the classroom, paying particular attention to the ideas that students raise

## Involves:

- Guided participation
- Scaffolded assistance
- Apprenticeship



“What ultimately counts is the extent to which instruction requires students to think, not just to report someone else’s thinking”

*(Nystrand, Gamoran, Kachur, & Prendergast, 1997, p.72).*

# “Reform Teaching”

Inquiry

Reasoning

Sense-making

Collaboration

Discourse



# Nudging Learning Along

Nudge

nəj/

a light touch or gentle push



# Responding to student ideas



# Observing Phenomena

## Make a Prediction

- Which fruit/vegetable will decompose first/last?
- Why?



# Observing Phenomena

## Make a Prediction

- What might students say?
- How to respond?
- How to guide/nudge learning forward?

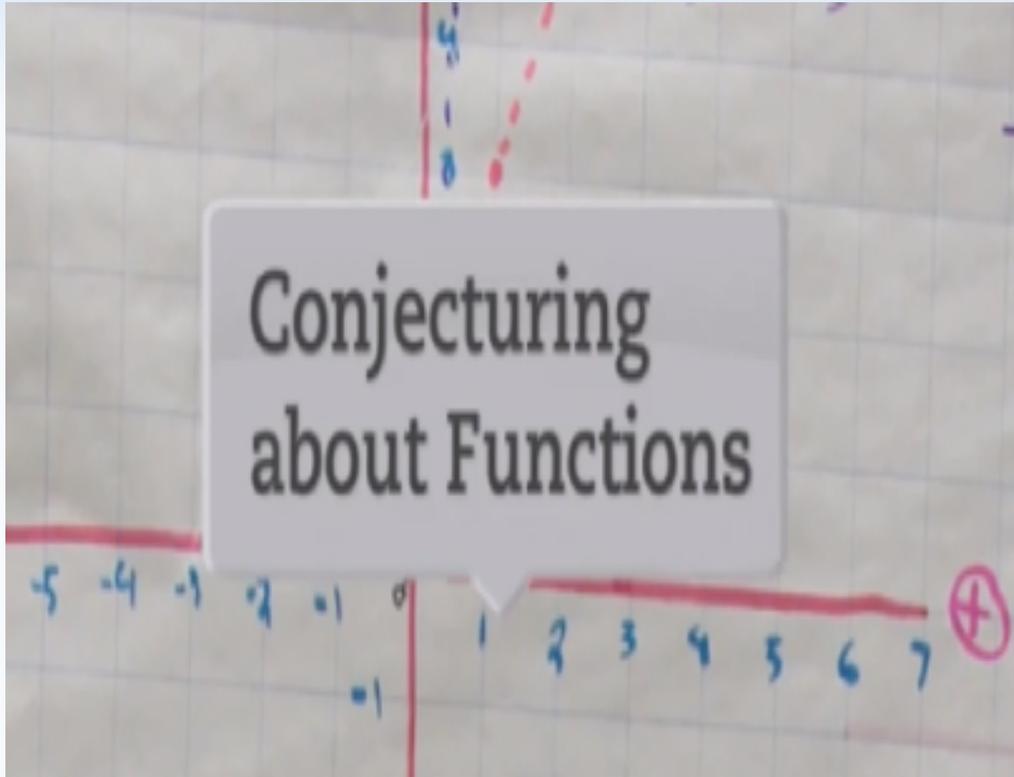


# **FRUIT AND VEGETABLE DECOMPOSITION**

**74 DAYS 1 PICTURE/40 MINUTES**

**PLAYED BACK AT 30 FRAMES/SEC**

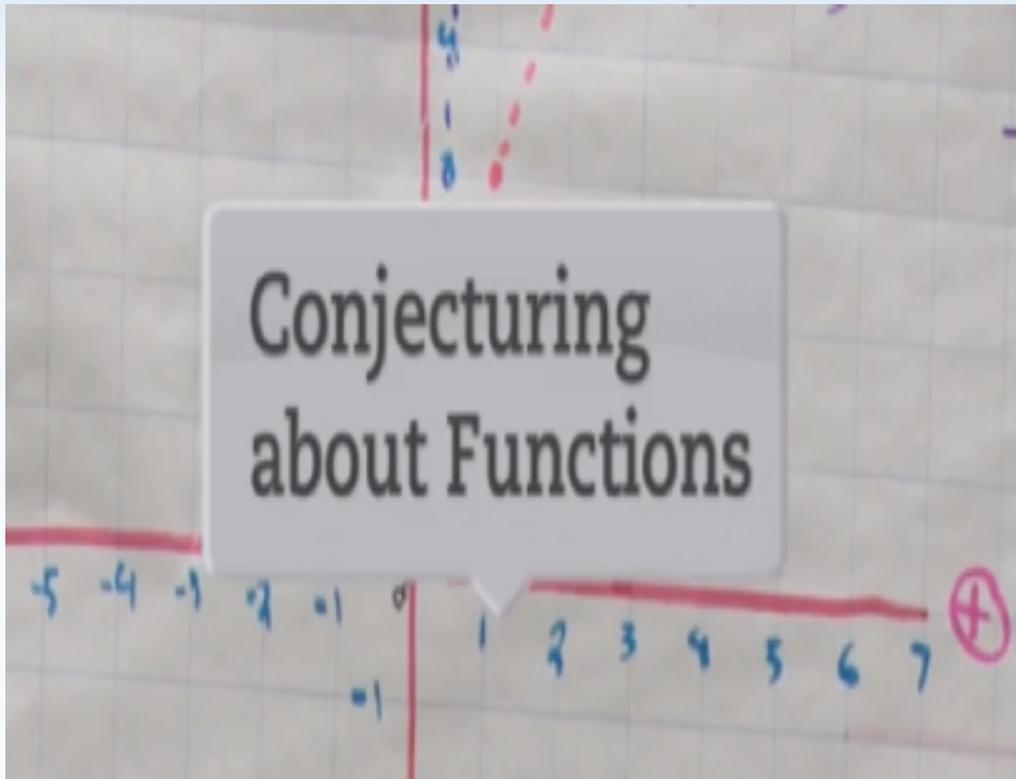
# Lesson (2 class periods)



Prior to lesson:

- Students examined a different set of growing patterns that differed in their rate of change
- Investigated them to determine the function of each pattern and make conjecture about the set

# Lesson (2 class periods)



This lesson:

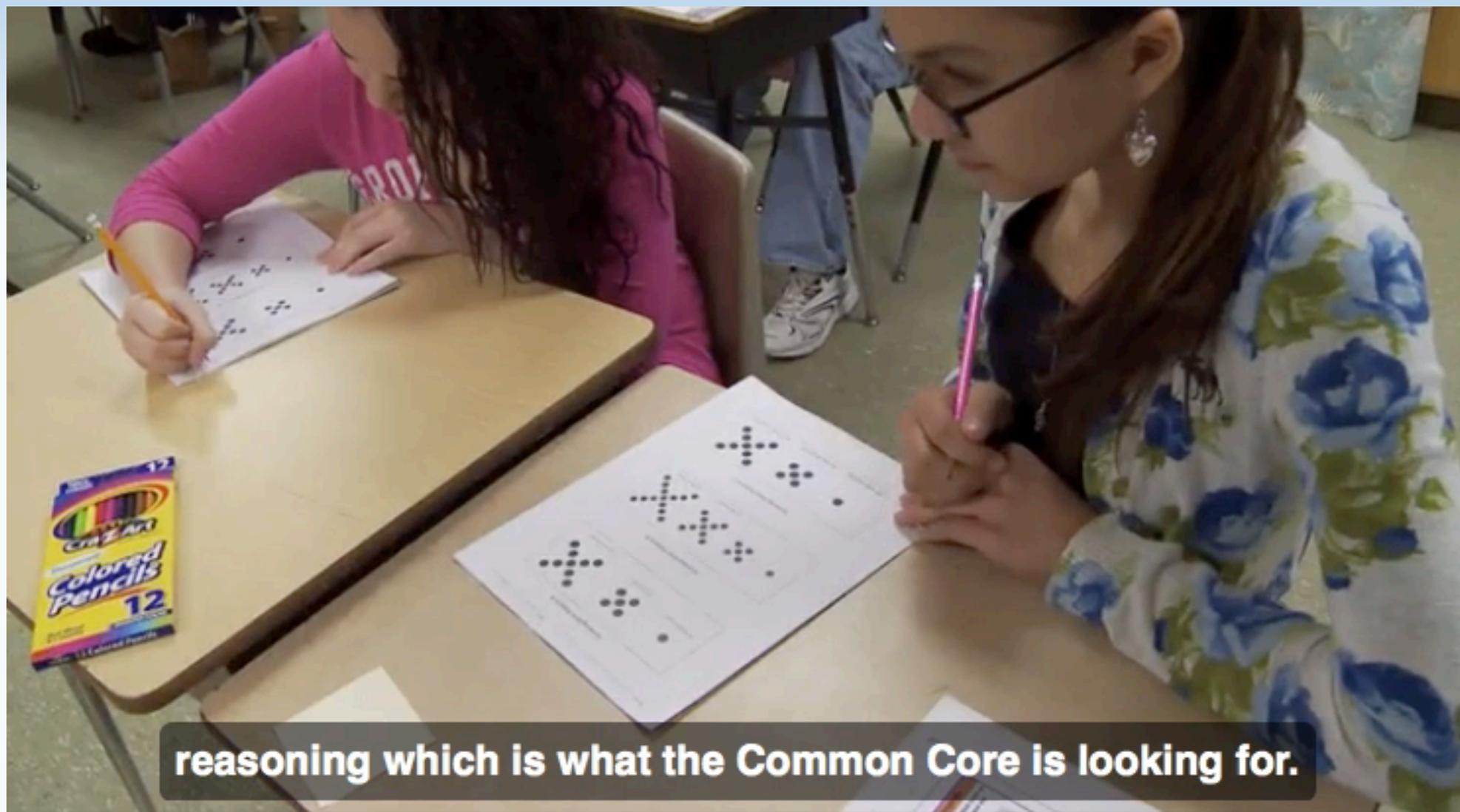
- Examining what happens when the pattern stays the same but the starting point shifts or changes

Subsequent lessons:

- Examine patterns that do not have a constant rate of change; extending learning to non-linear functions

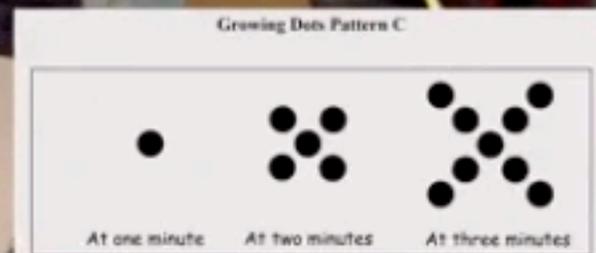
# As you watch the video, notice...

- How the task selection supports learning
- How the teacher “nudges” learning along in response to evidence
- How the teacher’s disciplinary knowledge undergirds the practice



**reasoning which is what the Common Core is looking for.**

So they'll be able to apply that later on.





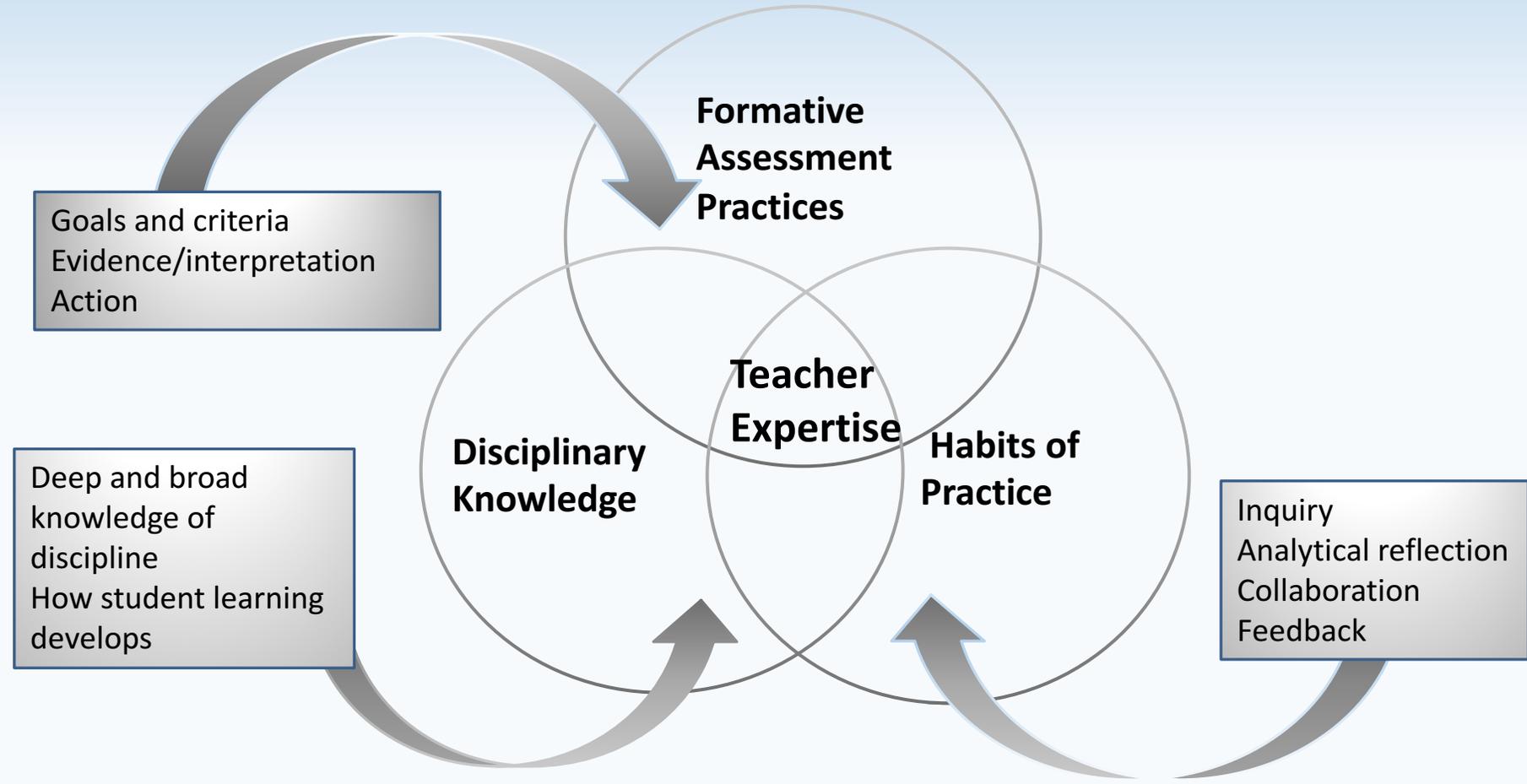
**with all of the other representations.**

*...the improvisational pedagogical skill of instantly knowing, from moment to moment, how to deal with students in interactive teaching-learning situations (Van Manen, 1995)*

# **Role of Leaders**

# Habits of Practice

- The teacher sees him/herself as a **learner**, continuously seeking opportunities to draw upon current education policy and research as sources of **analysis and reflection** to improve practice (InTASC, 2011, p. 18)
- The teacher takes initiative **to grow and develop with colleagues** through interactions that enhance practice and support student learning (InTASC, 2011, p. 19).



# Providing the Conditions

- Professional learning culture
- Collaborative relationships
- Structures and time
- Feedback
- Sustained commitment

# Summing Up

- Formative assessment can improve learning for all students
- Formative assessment is grounded in disciplinary knowledge
- “Reform” teaching involves responding to student ideas through formative assessment
- Leaders provide the conditions for continued professional learning





**Thank You!**

