

Module 2: Where the learner is now, Part 1: Using quick pre-assessments to elicit evidence of student strengths and learning

*Micro-Course 1:
Learning Acceleration Using Formative Assessment Processes in the
Classroom (Introductory Version)*



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Warm-Up

What do you think are the purposes and uses of pre-assessments?

What are strategies/tools you use to pre-assess students?

Establishing a Common Belief

***No student—regardless of background or experience—
approaches a concept, topic, or skill “empty.”***

Jensen, E. (2005). Teaching with the brain in mind (2nd ed.). Alexandria, VA: ASCD.

And not only are students not blank slates, they are also unique. Students arrive in our classrooms at different points along their learning journey, even if they are all in the same grade and around the same age.

Pre-assessment considers how we can build off students' developing understandings based on how we expect learning to develop in a content area.

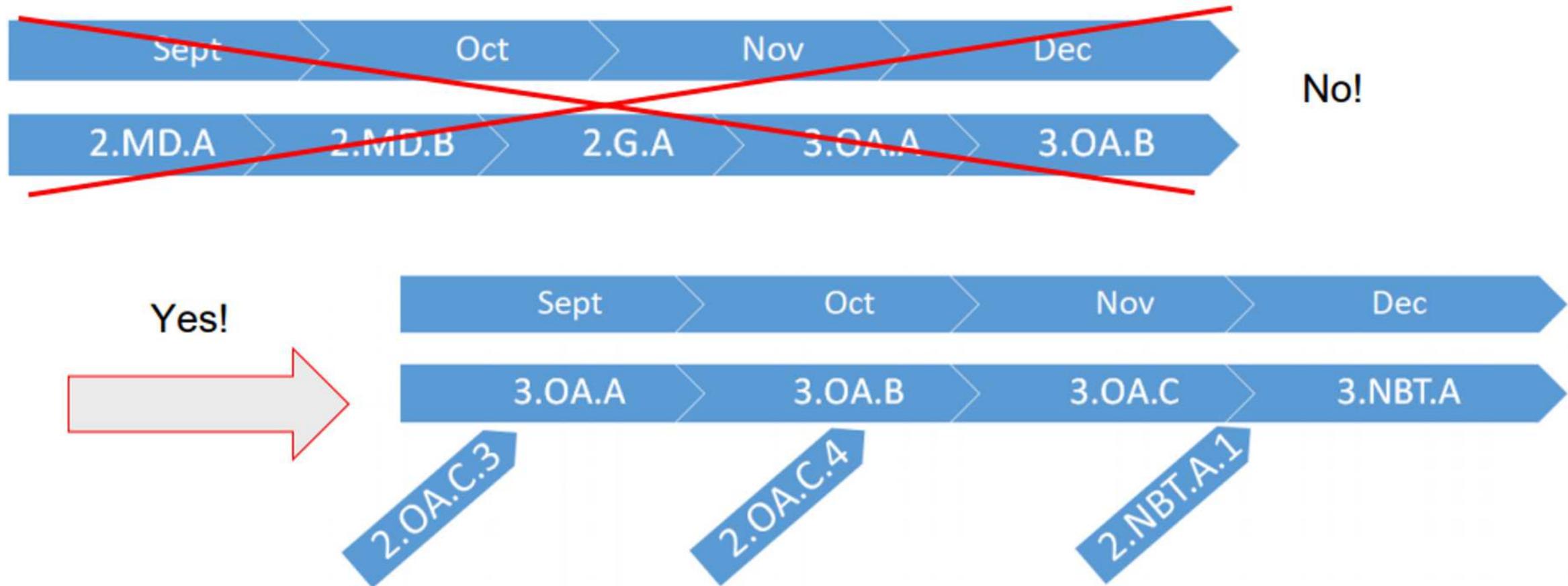


Defining Pre-Assessments

A way to collect information about what students already know and can do and any gaps or misconceptions that must be addressed.

<https://www.ncme.org/resources/formative/diagnostic-assessment>

Connection to Learning Acceleration



Misconception Alert

Using an end-of-year test at the beginning of the year tells a lot about what students do not know and little about what they do know.

For example, if I gave an end-of-year physics test to incoming physics students, what information would I gain except that they know very little physics.



Pre-Assessment Fundamentals

1. **Make student thinking visible** in relation to important goals of the unit and/or crucial pre-cursor knowledge, skills, and understandings.
 - Multiple-choice and true/false items do not usually lend themselves well to a pre-assessment unless students are prompted to explain, defend, or justify their choices. However, well-designed multiple choice items can provide insight into students' general misconceptions.
 - Student reasoning can also be captured through a short, purposeful conversation, especially if writing is not what you are focusing on.

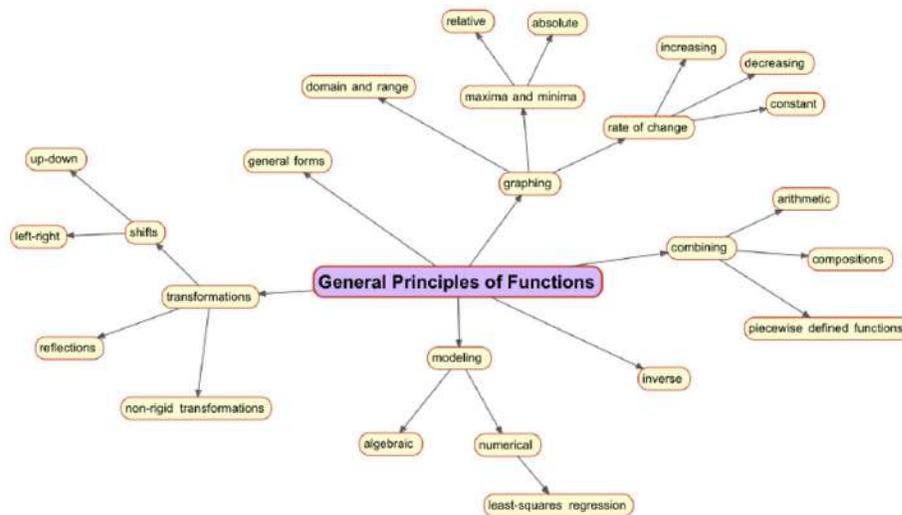
Pre-Assessment Fundamentals

2. Pre-assessment questions should be limited to those that have **predictable instructional implications.**
3. Should be **administered shortly before the unit or lesson** is taught so that the pre-assessment provides the most up-to-date information about students' strengths and needs.

Example Pre-Assessment Tools & Strategies

CONCEPT MAP

A concept map is a diagram that visually organizes concepts and the relationships between them. Here is a concept map of the general principles of mathematical functions from montessorimuddle.org:



ONE QUESTION

As its name implies, this diagnostic assessment technique involves asking students to answer just one multiple-choice question that gets at a central idea related to the topic you are about to introduce.

The question addresses one or more common misconceptions about the content, and the incorrect answers are written to reveal those misconceptions so you know if they need attention.

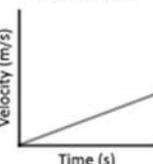
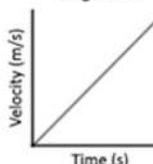
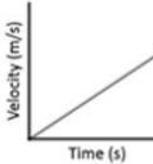
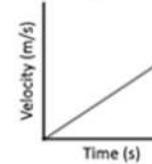
Here is an example of one question that is based on a learning progression about the solar system (Briggs, Alonzo, Schwab, & Wilson, 2006). Each of the answer choices is linked to developmental levels of student understanding, so an analysis of student responses can reveal what individual students and the class as a whole understand.

Which is the best explanation for why it gets dark at night?

- The Moon blocks the Sun at night. [Level 1 response]
- The Earth rotates on its axis once a day. [Level 4 response]
- The Sun moves around the Earth once a day. [Level 2 response]
- The Earth moves around the Sun once a day. [Level 3 response]
- The Sun and Moon switch places to create night. [Level 2 response]

Example pre-assessment tools from [NCME: Concept Map | One Question](#)

High School Physical Science Pre-Assessment Example

Goals of the Lesson	Pre-Assessment Question	Predictable Instruction Implications
<p>Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration (HS-PS2-1)</p>	<p>The graphs below show student results from an experiment where a solid block was pulled across the floor with a string. Which group's data best supports the idea that an object will have a greater acceleration when acted upon by a force?</p> <div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> <div style="text-align: center; margin: 10px;"> <p>Group A</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Pulling with a Small Force</p>  </div> <div style="text-align: center;"> <p>Pulling with a Large Force</p>  </div> </div> </div> <div style="text-align: center; margin: 10px;"> <p>Group B</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Pulling with a Small Force</p>  </div> <div style="text-align: center;"> <p>Pulling with a Large Force</p>  </div> </div> </div> <div style="text-align: center; margin: 10px;"> <p>Group C</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Pulling with a Small Force</p>  </div> <div style="text-align: center;"> <p>Pulling with a Large Force</p>  </div> </div> </div> <div style="text-align: center; margin: 10px;"> <p>Group D</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Pulling with a Small Force</p>  </div> <div style="text-align: center;"> <p>Pulling with a Large Force</p>  </div> </div> </div> </div> <p>Select the correct answer and explain your reasoning.</p>	<p>Student work could be sorted into three piles that will lead into differentiated instruction (flexible grouping) for this lesson:</p> <ol style="list-style-type: none"> 1. Students who did not select the correct answer 2. Students who selected the correct answer, but were not able to explain using Newton's second law of motion 3. Students who both selected the correct answer and explained fully

Gr 5 Math Pre-Assessment Example

Goals of the Lesson	Pre-Assessment Question	Predictable Instruction Implications
<p>Student will understand equivalent fractions represent the same value (5.NF.A.1)</p> <p>Students will know how to replace fractions with equivalent fractions (5.NF.A.1)</p>	<p>Create four equivalent fractions for $\frac{1}{2}$ and draw a visual model for each.</p>	<p>Using the OGAP fraction learning progression, student work could be sorted into three piles that will lead into differentiated instruction (flexible grouping) for this lesson:</p> <ol style="list-style-type: none"> 1. whole number reasoning, not fractional reasoning applied 2. uses a fractional or transitional strategy like partitioning visual models, but the solution includes an error (e.g., partitioning, size of whole, concept error in part of the problem) 3. accurately finds equivalent fractions and visual model

Gr 1 ELA Pre-Assessment Example

Goals of the Lesson	Pre-Assessment Question	Predictable Instruction Implications
<p>Students will understand that a central message is the author's statement of his/her beliefs. The central message or lesson addresses the author's point of view about relationships between people (RL.1.2).</p> <p>Students will know how to use word details from the story to tell about a character (RL.1.3).</p>	<p>After the teacher reads the story aloud, students are asked to identify and tell the teacher about the character.</p>	<p>Student oral responses could be sorted into three categories that will lead into differentiated instruction (flexible grouping) for this lesson:</p> <ol style="list-style-type: none"> 1. Student is not able to identify the character 2. Student can identify the character, but is not able to retell any details about that character 3. Student identifies and provides details about the character

Finding Pre-Assessment Questions



What if you want to select (rather than design) pre-assessment questions aligned with your unit of instruction, lesson goals, and state standards?

Just make sure students are asked to BRIEFLY EXPLAIN THEIR THINKING and (as appropriate) draw a visual model.

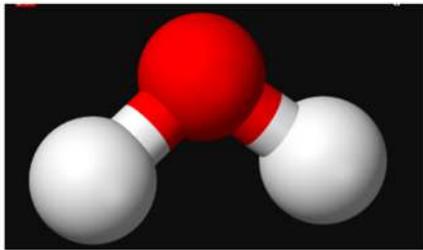
It must make student thinking visible!

Link to [Virginia's Just in Time Mathematics Quick Checks](#) that are created for every Virginia math standard and could be cross-walked with California standards

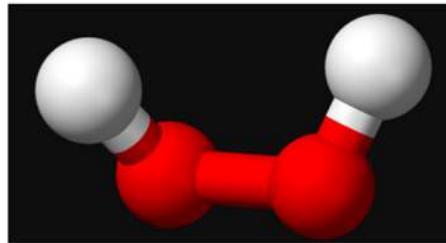
Practice Activity: Gr 6 Physical Science Example

Question 1: Models (6-MS-PS1-1)

Water and hydrogen peroxide are both liquids and both contain hydrogen and oxygen molecules; however, their properties and uses are very different because of their molecular structure. Water is stable, while hydrogen peroxide is reactive. Models of the two molecules are pictured below. In the models, the white spheres represent hydrogen atoms and the red spheres represent oxygen atoms.



Water



Hydrogen Peroxide

Images used from [Ben Mills Wikimedia Commons](#) with permission under [Creative Commons 3.0](#).

Based on the models, what structural differences between the two molecules might account for their differing properties? Select **two** correct answers.

- A. Water has two hydrogen atoms while hydrogen peroxide has only one.
- B. There are two oxygen atoms bonded together in hydrogen peroxide while water only has one.
- C. Water and hydrogen peroxide both contain two molecules of oxygen.
- D. Water has half as many total atoms as hydrogen peroxide.
- E. The hydrogen peroxide molecule has a different shape because it has an extra atom in its molecule.

What would you need to ask students to do in order to use this item for pre-assessment purposes?

Practice Activity: Gr 4 Math Example

Operations and Algebraic Thinking

4.OA.A.03

Items 20 – 35

ITEM 20

The Kennedy High School basketball team earns \$8 for each admission ticket sold at a game. There are 11 rows of seats in the arena, and each row has 58 seats. During one game, every seat is full. Which is the best estimate for the total amount the basketball team will earn from this game?

- A. \$600
- B. \$1,200
- C. \$5,000
- D. \$12,000

What would you need to ask students to do in order to use this item for pre-assessment purposes?

Practice Activity: High School ELA Example

A student is writing an article about safety in high school athletics. Read the draft of the article and complete the task that follows.

Just how safe are high school athletics? Critics would argue that most sports are highly dangerous to those teens who participate in them. Recently football has been the most closely scrutinized. The dangers of the high school gridiron are many: head injuries, knee injuries, and heat exhaustion. It seems as if every year more studies are released implicating the immediate and long-term effects of this highly physical sport. Football, however, is not the only sport that has drawn attention. Any sport that involves contact (basketball, hockey, lacrosse) can leave its players vulnerable to injury. The question then becomes: what is being done to prevent these injuries?

Steps are being taken to reduce the most serious complications of all sports. One way that these issues are being addressed is through the development of new equipment. Another way is through more stringent rules that govern practices as well as game time situations. Most importantly, educating players, coaches, and parents to the real dangers of athletics has taken a new priority. Through education, regulations, and equipment, high school sports can continue to be a source of entertainment, not danger.

Select the **two** sentences that provide the **best** evidence to support the main idea of the paper.

- It has been estimated that nearly half of all high school students participate in athletics on some level.
- This school district reports that each high school has a minimum of five varsity sports; this number does not include junior varsity or community leagues.
- Bob Jones, Southern High's athletic director, added this comment: "We had a very successful season; injuries did not play a measurable role in our record."
- District wide data indicates that students are injured on school property at a relatively low rate; last year only thirty-three accidents were reported that resulted in student injury.
- One of the most visible educational campaigns has been launched by the National Football League (NFL); it is entitled "Heads Up" and trains coaches and student athletes on techniques to avoid head injuries.
- In a 2010 study, American University found that close to 80 percent of high school athletes had reported injuries during their athletic careers; approximately 25 percent of these injuries were considered serious.

What would you need to ask students to do in order to use this item for pre-assessment purposes?

Making Student Thinking Visible

Asking ‘Why’. Why did you select the answer(s) you did?

- Science Example: Explain your thinking about what makes certain molecular structures stable or reactive using words and models/drawings?
- Math Example: Explain your thinking using words and models/drawings?
- ELA Example: Explain why the two sentences you chose provide the best evidence to support the main idea of the paper.

Then what would you need to do with the student responses?....

Then What?...Student Work Analysis

There's no point in giving a pre-assessment if you do not plan to examine the resulting student work and use it to monitor/adapt your instruction!

1. Sort the student work into three piles or groups:
 - What is the evidence of developing understanding that can be built upon?
 - What issues or concerns are evidenced in the student work?
2. What are the next instructional steps based on the evidence?

We talk more about student work analysis in Module 4 as it is a key component of all formative assessment processes!

Going Deeper

Module 1

- **Overview:** Formative assessment processes and learning acceleration (Introduction)

Module 2

- **Where the learner is now, Part 1:** Using quick pre-assessments to elicit evidence of student strengths and learning needs

Module 3

- **Where the learner is now, Part 2:** Using formative assessments during or after instruction to elicit evidence of student strengths and learning needs

Module 4

- **Closing the gap, Part 1:** Using evidence of learning to adjust instruction and better meet students' needs



Reflection Questions

1. Describe the purpose, characteristics, and fundamentals of designing or selecting a pre-assessment.
2. Consider an upcoming lesson or unit of study that you teach. What are the learning goals?
3. What pre-assessment question(s) could you develop based on the goals for your unit or lesson? What are the instructional implications for each?
4. Describe one way your pre-assessment could be used by students to set, monitor, or adjust their own learning goals.
5. What is one key takeaway and one lingering question you have after listening to this module?