Update of the Mathematics Assessment Framework for the Nation's Report Card

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WestEd

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The Nation's Report Card

National Assessment of Educational Progress (NAEP)

- Congressionally-mandated independent measure of student achievement
- Reports group-level performance (no results for individual students or schools)
- Reports by achievement levels since 1990
- Provides state-level results in several subject areas
- Administered by the National Center for Education Statistics (NCES)

- In 2019 about 140K grade 4 students and 150 grade 8 students completed the exam.
- Grades 4 and 8 exam is every 2 years.
- Grade 12 exam is every 4 years, next administration for grade 12 will be in 2021, then 2025 – with the new framework.

- NAEP is also known as the Nation's Report Card.
- NAEP has been in place as a congressionally-mandated assessment since 1969.
- It is important to note that NAEP's goal is to report at the group-level only. By design and by law, NAEP does not produce or report information for individual students or schools.
- As the National Assessment of Educational Progress, trend reporting is a central part of NAEP's mission.
- Reporting by achievement levels has been done since 1990 (shortly after Congress created the Board in 1988).
- In some subject areas, NAEP provides state-level results in addition to national results (not for Writing at this time).

Nationally representative ongoing measure of student achievement
- Reports group-level performance (no results for individual students)
- Provides state-comparable results in several subject areas
- Administered by the National Center for Education Statistics (NCES), which is responsible for NAEP operations

NAEP Frameworks

- Developed through a comprehensive, inclusive, and deliberative process
- Describe the content and format of a NAEP assessment
  - What to measure at each grade
  - How to measure it
  - How achievement levels are to be represented
- Written for diverse audience of educators, policymakers, and citizens

- Frameworks specify what should be measured and how; they include percentages of the assessment that should be devoted to each content area and item type.

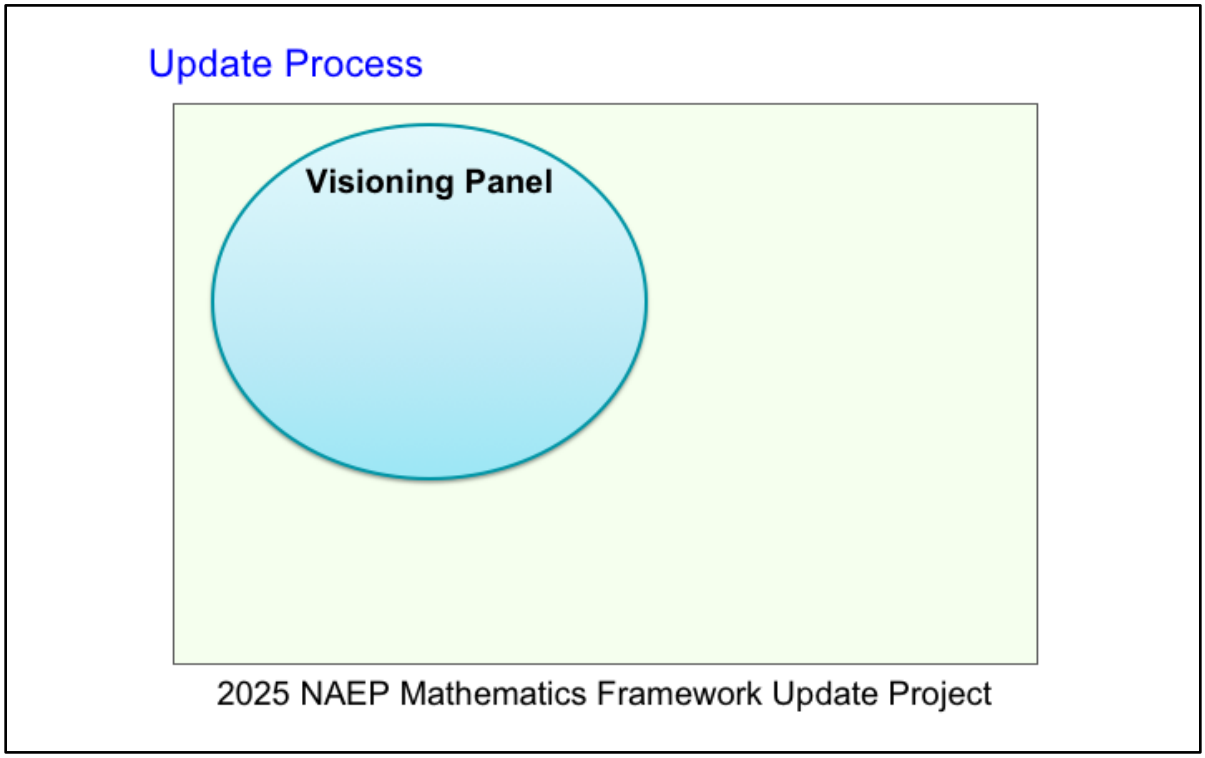
Mathematics Framework for 2025 NAEP

Table of Contents

The update has brought to NAEP for the first time a description of types of mathematical activity, specification regarding the “doing” in “knowing and doing” mathematics. This appears in Chapter 3 as mathematcal practices.

Some Backstory...

- Some backstory on how we (Shandy and Mark) got here...



It all started on a breezy day in late October with preliminary online meetings of the 30 person Visioning Panel... the group was selected to represent stakeholders and educational constituencies of many types....

A quick schematic about the components and information flow in the project.
Update starts with 30 experts to establish Guidelines for how the update should be focused given the existing Framework and the key issues concerning it arising from knowledge and purpose shifts since the last update at the turn of the century.

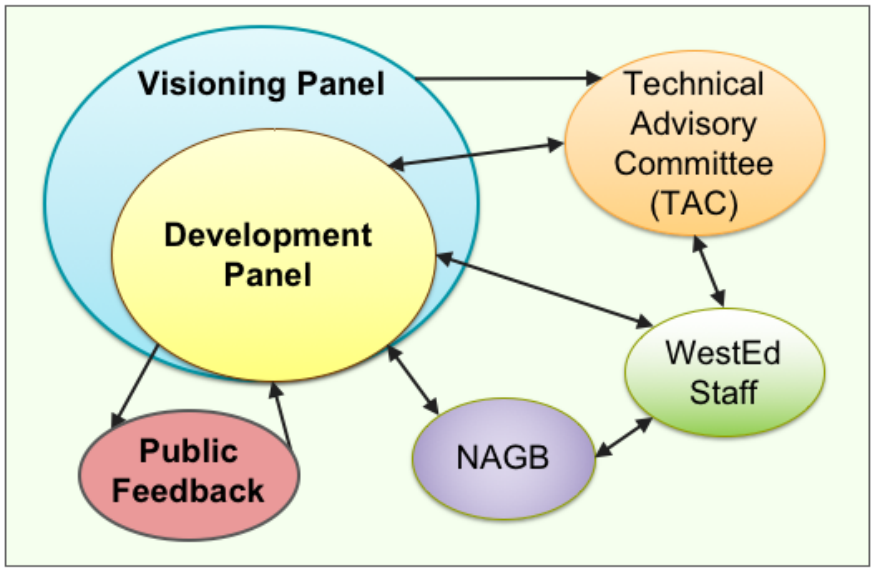
Panel Representation

Panelists from stakeholder groups and organizations:

- Teachers
- State and Local/District Administrators
- Policymakers from Educational Organizations
- Content Specialists
- Business & Employer Representatives
- Researchers and Technical Experts
- Curriculum Developers
- Users of Assessment Data
- CBMS
- National Council of Teachers of Mathematics
- TODOS: Mathematics for ALL
- Mathematical Association of America
- Council of the Great City Schools
- Association of State Supervisors of Mathematics
- Business Roundtable
- National School Boards Association
- National Association of Elementary School Principals
- National Association of Secondary School Principals

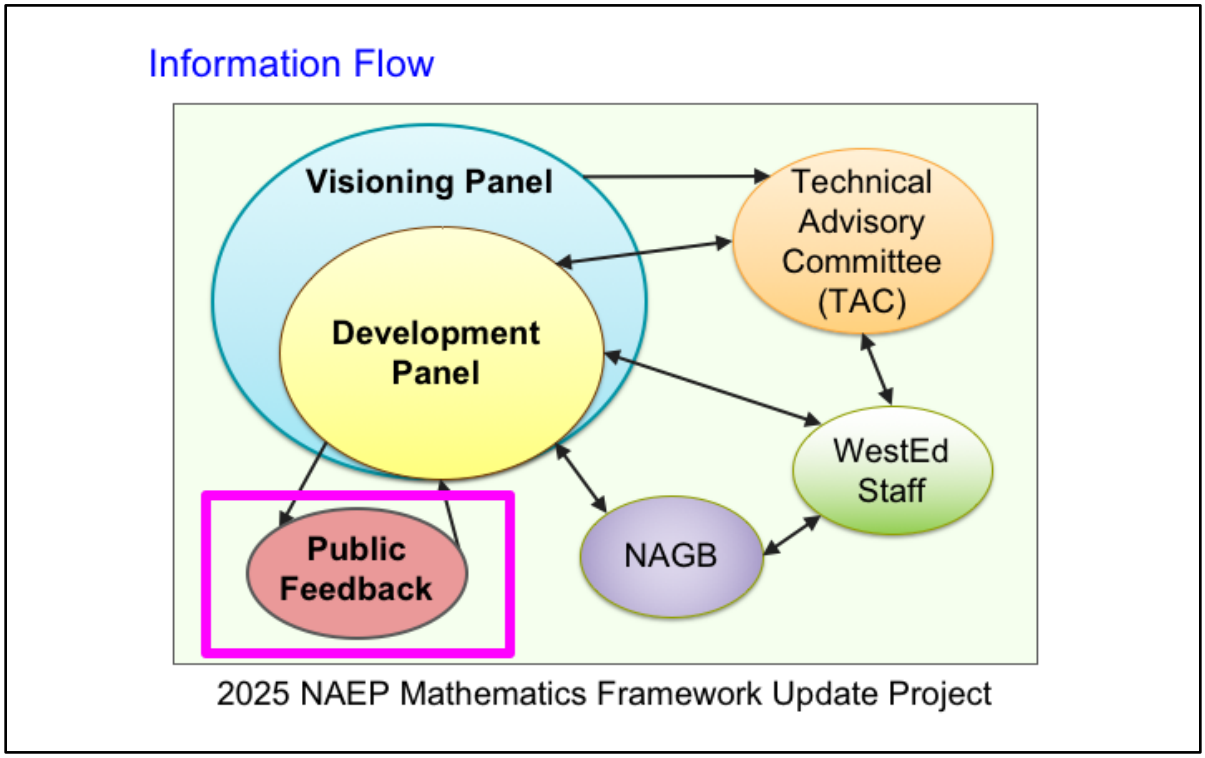
- Stakeholder groups plus organizations on the panel
- 30 member Visioning Panel, half of them, 15, continued on the Development Panel – here's a quick cartoon for the process...

Information Flow



2025 NAEP Mathematics Framework Update Project

Guidelines are taken up by the Development Panel, a subset of 15 of the 30 on the Visioning panel.
They revise the Framework with the help of...
A Technical Advisory Committee, made up of 7 experts in psychometrics and test design.
The TAC advises...
...based on the Visioning Panel initial Guidelines and subsequent needs for advice from the Development Panel. This all happens in a universe where...
..the National Assessment Governing Board has established policy and has oversight and WestEd staff support the update process through regular conversations...
This set of interactions began in October 2018, and led to a DRAFT of a new Framework to guide the development of the 2025 NAEP Math assessment (pilot in 2023).
HOWEVER, before the draft is finalized there is an important additional process...
Cycles of feedback from the nation through public feedback, throughout May.



This is where we are now. Now open, the feedback window closes June 7.

Framework Content Areas and Practices

- Number Properties and Operations
- Measurement
- Geometry
- Data Analysis, Statistics, and Probability
- Algebra

- Representing
- Abstracting and Generalizing
- Justifying and Proving
- Mathematical Modeling
- Collaborative Mathematics

Number Properties and Operations(including computation and the understanding of number concepts)
Measurement(including use of instruments, application of processes, and concepts of area and volume)
Geometry(including spatial reasoning and applying geometric properties)
Data Analysis, Statistics, and Probability(including graphical displays, and statistics)
Algebra (including representations and relationships)

Next: HAND OUT Exhibit 3.20

Challenges in Current Draft

- Opportunity to Learn as Thread Through Framework and Reporting
- Math literacy as a Cross-Cutting Construct
- Scenario-based Tasks as New Item Type
- Distribution of Items and Assessment Time*
- Delineation of Mathematical Practices*

Issues surfaced by expert review of the *Framework – we are going to ask you to weigh in on these both here and in comments you give us.*

- Opportunity to Learn as Thread Through Framework and Reporting (in content, practices, and item type discussions and reporting connections made possible by more/different contextual variables) – Really appreciate comments in your feedback on the draft about this.
- Math literacy as a cross-cutting construct – well-defined but comes from a perspective on math knowing and doing that is foreign to the previous NAEP framework focus.
- Scenario-based tasks as new item type – How do they support the assessment of practices in ways that discrete items don't and in ways that allow students to show what they know and can do; without such tasks, assessment of collaborative math and modeling would be shallow, focused on surface features.
- Distribution of Items and Assessment Time – Our first activity today
- Delineation of Mathematical Practices - What makes one practice distinct from another for the purposes of measurement (that's another activity – creating examples and non-examples for item developers) and how they relate to NCTM and CCSSM

Activity – Distribution of Items by Practice

Mathematical Practice Area	Percentage of Items
Representing	15
Abstracting and Generalizing	15
Justifying and Proving	25-30
Mathematical Modeling	10
Collaborative Mathematics	10
No practice assessed	20-25

Create justifications for each proportion or suggest alternate proportions with rationales.

up to 20min

Here are some numbers the panel proposed based on their experience with the practices in teaching, learning, and assessment (mostly formative). THESE ARE PROPORTIONS IN THE ENTIRE ADMINISTERED ITEM POOL. (not individual student experience)

HANDOUT: Exhibit 3.20

HANDOUT: Exhibit 4.3 with additional blank tables.

Feel free to take this with you with your notes to add to your commented draft ☺

Consider this table a sacrificial draft. Now, in your groups, create justifications for each proportion or suggest alternate proportions with rationales.

We are NOT soliciting proposals for wholesale change in what the practices are!

Share

What was interesting or challenging about that?

5 min report out.

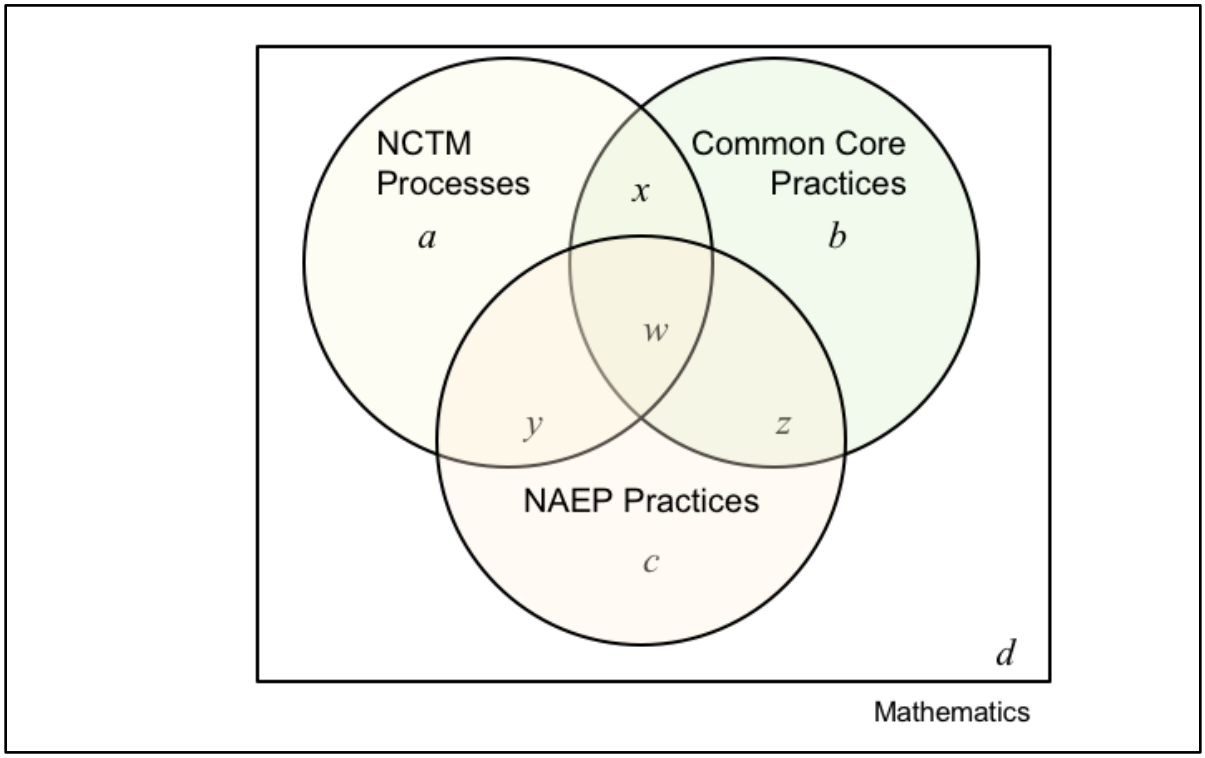
Activity – Practices Relationships with Policy

How would you illustrate the (inter)relationships among NCTM Process Standards, Common Core Standards for Mathematical Practices, and the NAEP Mathematical Practices?

10 min to Draw and 5 min to compare with another group, then share.

Handout: blank paper and 1 page printout of NCTM Process Standards and CCSS SMP.

Something more nuanced than this picture (Venn with all in center).

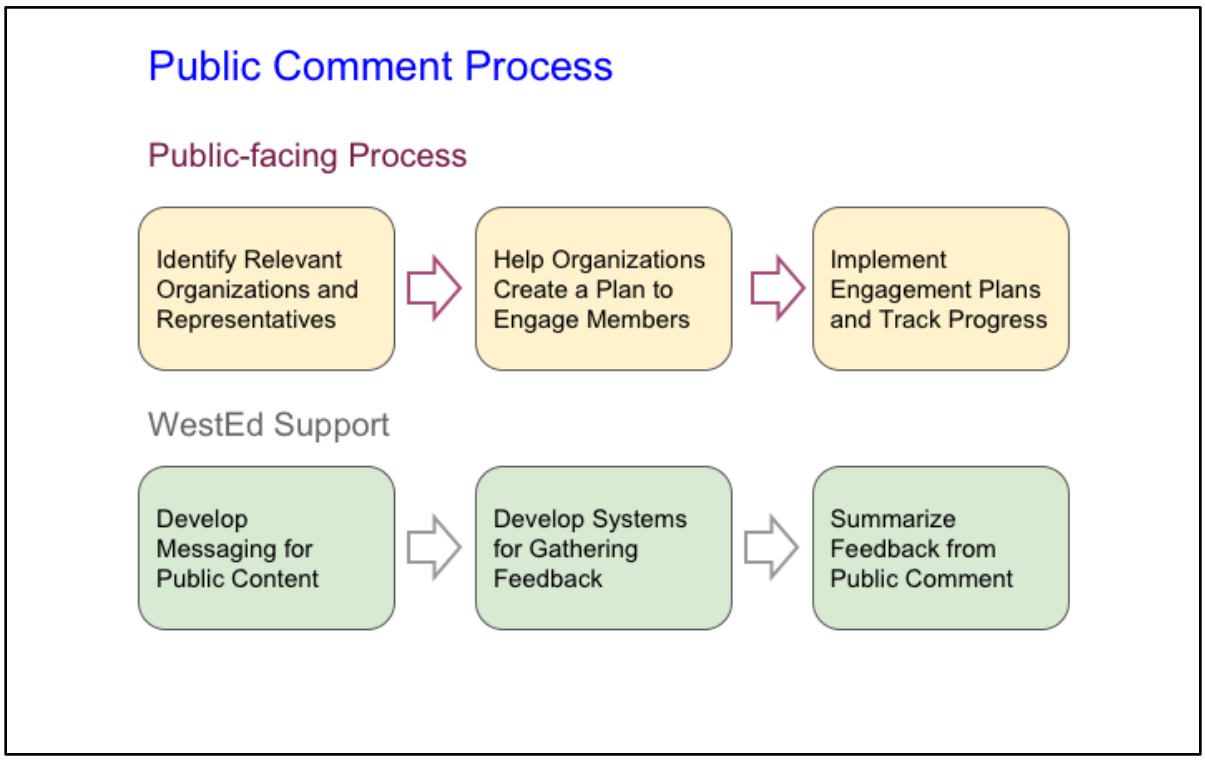


If we do the exercise of identifying what is in each region

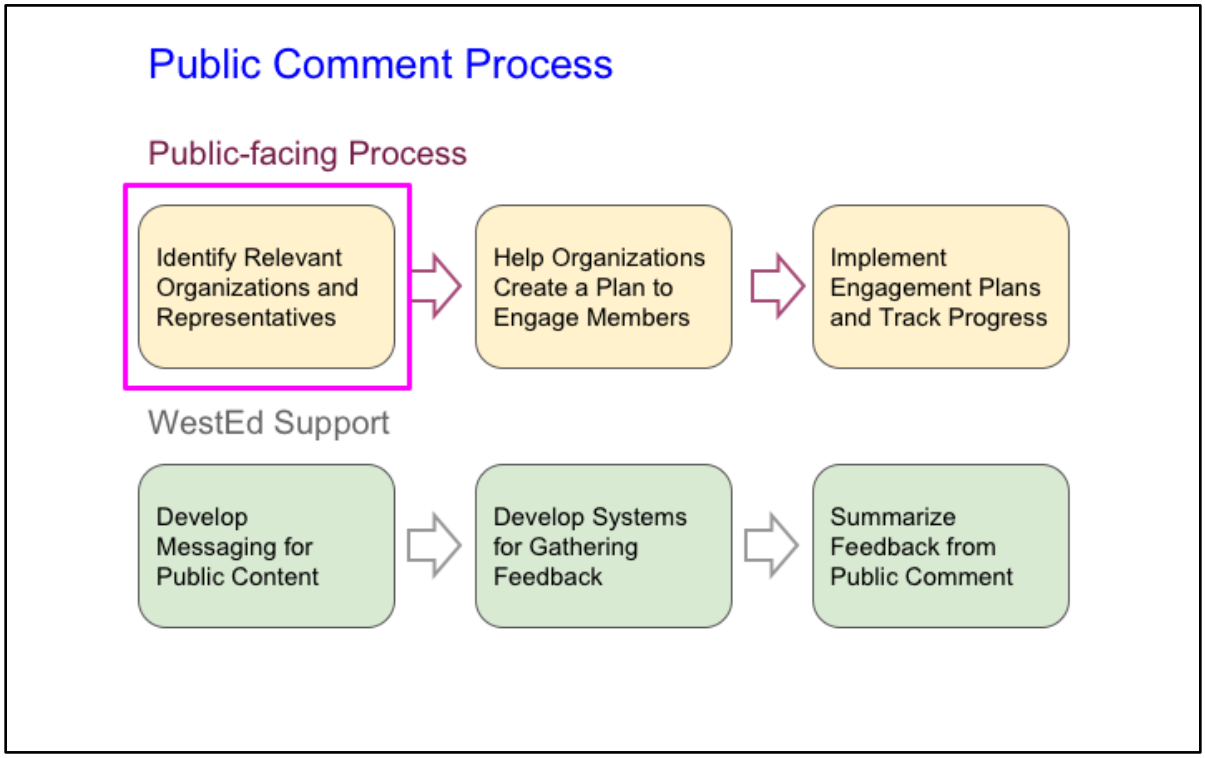
Interesting but not productive

In fact, there's already a book for classroom teachers all about connecting the NCTM Process standards and common core Standards for Math practice

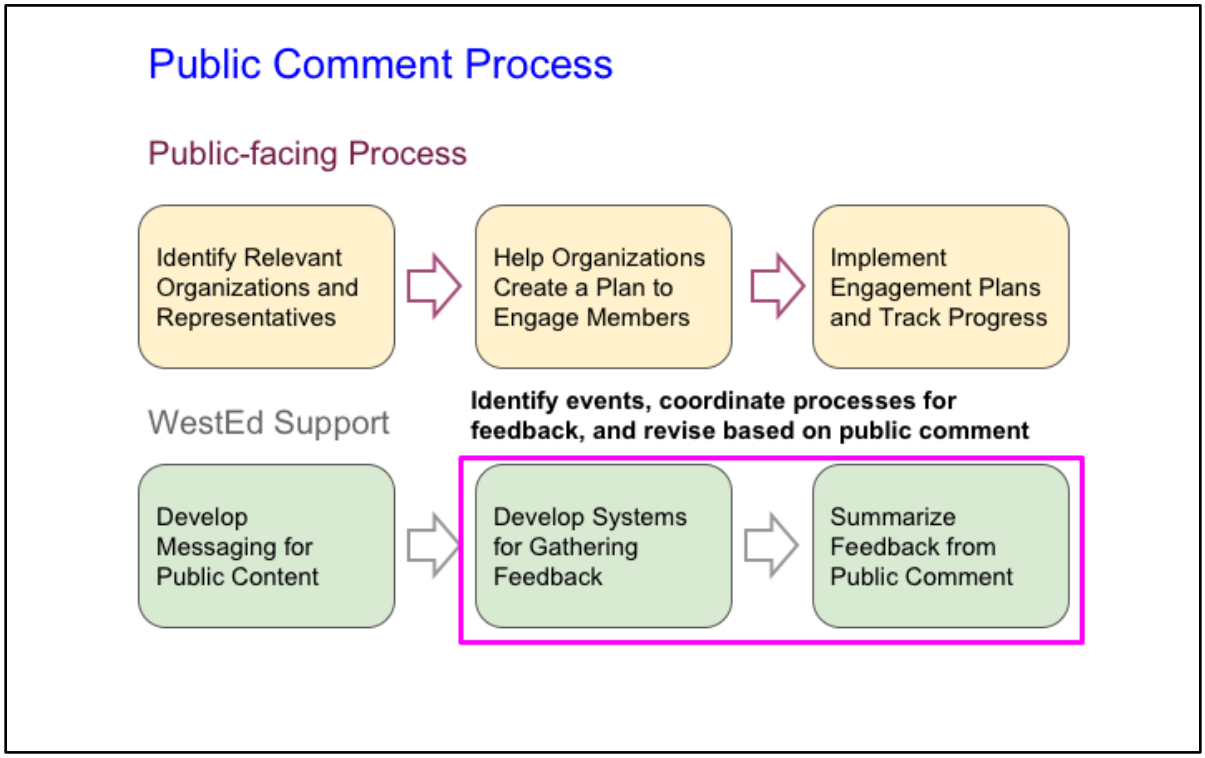
Courtney Koestler, Mathew Felton-Koestler, Kristen Bieda, Samuel Otten (2013)


Public Comment Process
Public-facing Process
Identify Relevant Organizations and Representatives
Help Organizations Create a Plan to Engage Members
Implement Engagement Plans and Track Progress
WestEd Support
Develop Messaging for Public Content
Develop Systems for Gathering Feedback
Summarize Feedback from Public Comment

Quick recap



Last time we visited, in December, we were here. Now, we are....

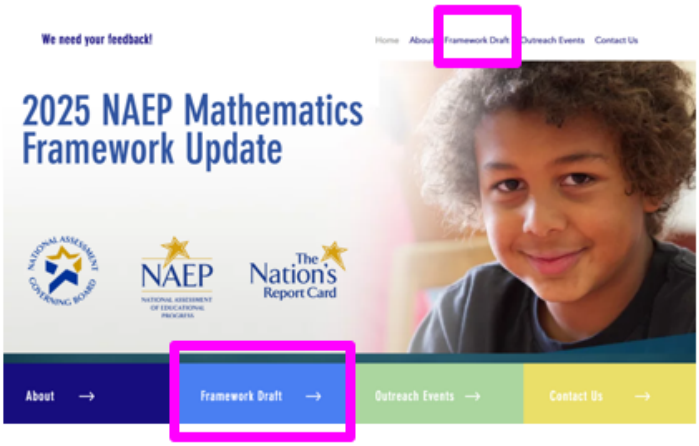


Here! What's Next? <slide>

What's Next?

Get, comment in, & upload your own copy!

naepframeworkupdate.org



Add your insights from today and from further review through comments on your own copy of the draft framework.

Click the "Framework Draft" tab .... *at the top or the bottom.*

Thank You!

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naepframeworkupdate.org
"Framework Draft" tab.

More about NAGB: www.nagb.gov

More about NAEP: www.nationsreportcard.gov

Goals of mathematics education in the United States (from CBMS Catalyzing Change conversation in May)

- to be an educated citizen
- to be prepared for a Pathways program at a post-secondary institution
- to be prepared for a technical program or a less math-intensive STEM trajectory
- to be prepared for a math-intensive STEM trajectory such as engineering, physical science, or mathematical science

Absent from the above: to be prepared for a career.