Assessment, Learning, Equity: What will it take to move to the next level?

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Center for Assessment

Presentation at ***Educational Testing in America: State Assessment, Achievement Gaps, National Policy and Innovations***

Sponsored by Educational Testing Service and the College Board

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Overview

- **Main Assertion: Assessments can help close achievement gaps, particularly when included in *comprehensive* and *coherent systems* of assessment, instruction, curriculum, and policy**

- **Recent Context of Assessment and Equity**
- **Comprehensive and Coherent Systems**
- **Going Beyond Large-scale Assessment & Policy**
- **Promising Challenges**

Recent Context of Assessment & Equity

- Two decades of standards-based education: common content and achievement standards for all – makes "achievement gaps" visible, of concern
- Actions fueled by standards, assessment, and accountability: "coherent systems" of clear expectations, useful feedback, appropriate consequences (rewards, support, intervention, sanctions) – by the state, aimed at schools (e.g., NCLB)
- Less attention paid to programmatic supports for opportunity to learn under typical management-by-objective strategy ("Define outcomes, leave how to achieve outcomes up to local agent") ("local control" "concern about input variables")
- Achievement gaps – some notable successes, many mixed results

Theory of Action About Assessment

- **"Theory of Action" – our idea or model of how standards-based assessment and accountability will lead to improved learning**
- **Current Theory of Action: Annual assessments on state content standards, combined with accountability, will result in all students becoming proficient in reading and mathematics because when poor results are reported, [this] will happen… [people will figure out what is needed and will do it]**

Theory of Action – 2

- **Comprehensive System Theory of Action: Student learning will increase, school capacity will increase, and achievement gaps will decrease as assessment is used to coherently *signal*, *evaluate*, and *inform* learning and teaching at each level of the system (at least state, district, school, classroom, individual)**
  - **Signal: "What is important?"**
  - **Evaluate: "What do I know about how I did?"**
  - **Inform: "How can I do better?"**

Comprehensive Systems

- Coherent assessment information that leads to action

	Level of Action			
Function	National/ State	District	School	Classroom /Individual
Signal				
Evaluate				
Inform				

Comprehensive Systems

- Coherent assessment information that leads to action
  - Focused on *outcomes* and *key processes* for reaching outcomes
  - Provides information for *external* quality monitoring and *internal* action
  - Example of processes: Informative feedback – violin

Comprehensive Systems

- Assessment (levels, functions, outcomes/processes, external/internal)
- Also attends to (not focus of this presentation):
  - Valued constructs/content
  - Student inclusion
  - Multiple indicators/purposes
  - Valid and useful information (e.g., assessment formats)
  - "Engines for change" in addition to accountability (especially curriculum, instruction, educational system structures)

Interlude: Definitions

(from Janet Baldwin Anderson, AIR, slides 9-15, 19)

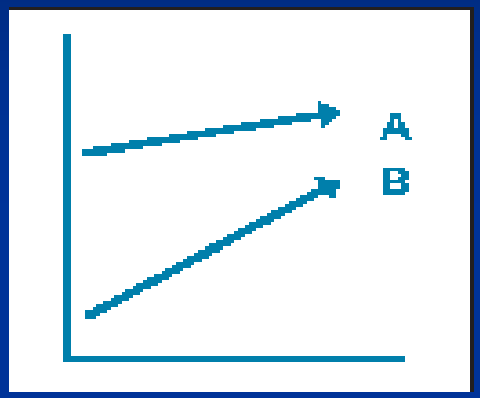
- An achievement score gap is the difference in average measured achievement between two groups of students at one point in time
  - May compare groups to each other or relative performance to a common criterion
  - May be extended into *trends* over time
- Gaps can widen or narrow over time, due to relative change of one or both groups; often sensitive to metric (especially contrast percent proficient vs. scale scores)

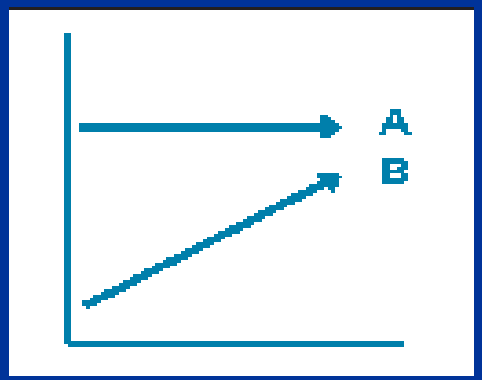
Five Ways Gaps Can Close

- Very Positive
- Positive
- Positive-Negative
- Negative
- Very Negative

(from Janet Baldwin Anderson, AIR)

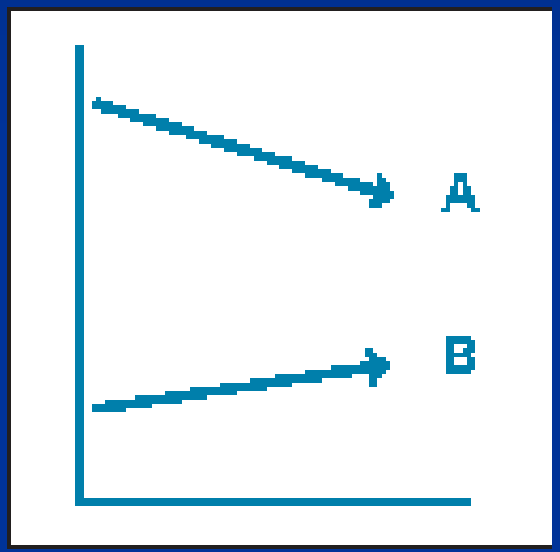
Positive Ways Gaps Can Close





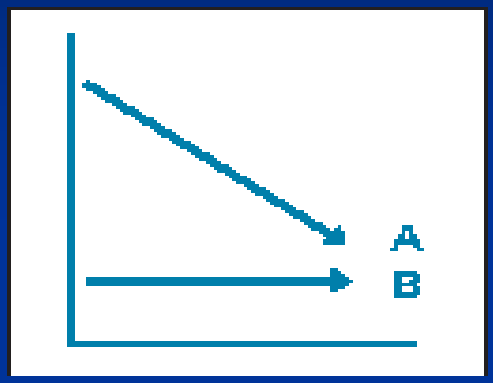
- **Very positive**. The average score of the *higher* performing group increases over time, while the average score of the *lower* performing group increases at a faster rate
- **Positive**. The average score of the *higher* performing group does not show a change over time, while the average score of the *lower* performing group increases.

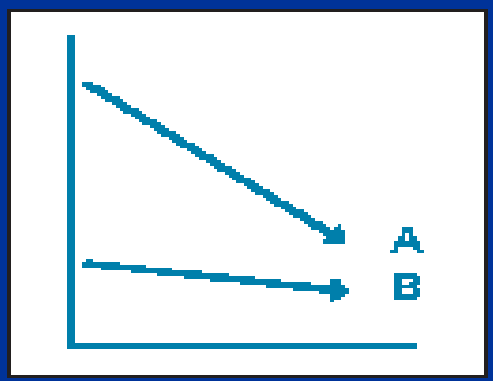
Positive-Negative Gap Closing



- **Positive-Negative**. The average score of the *higher* performing group declines over time, while the average score of the *lower* performing group increases.

Negative Ways Gaps Can Close





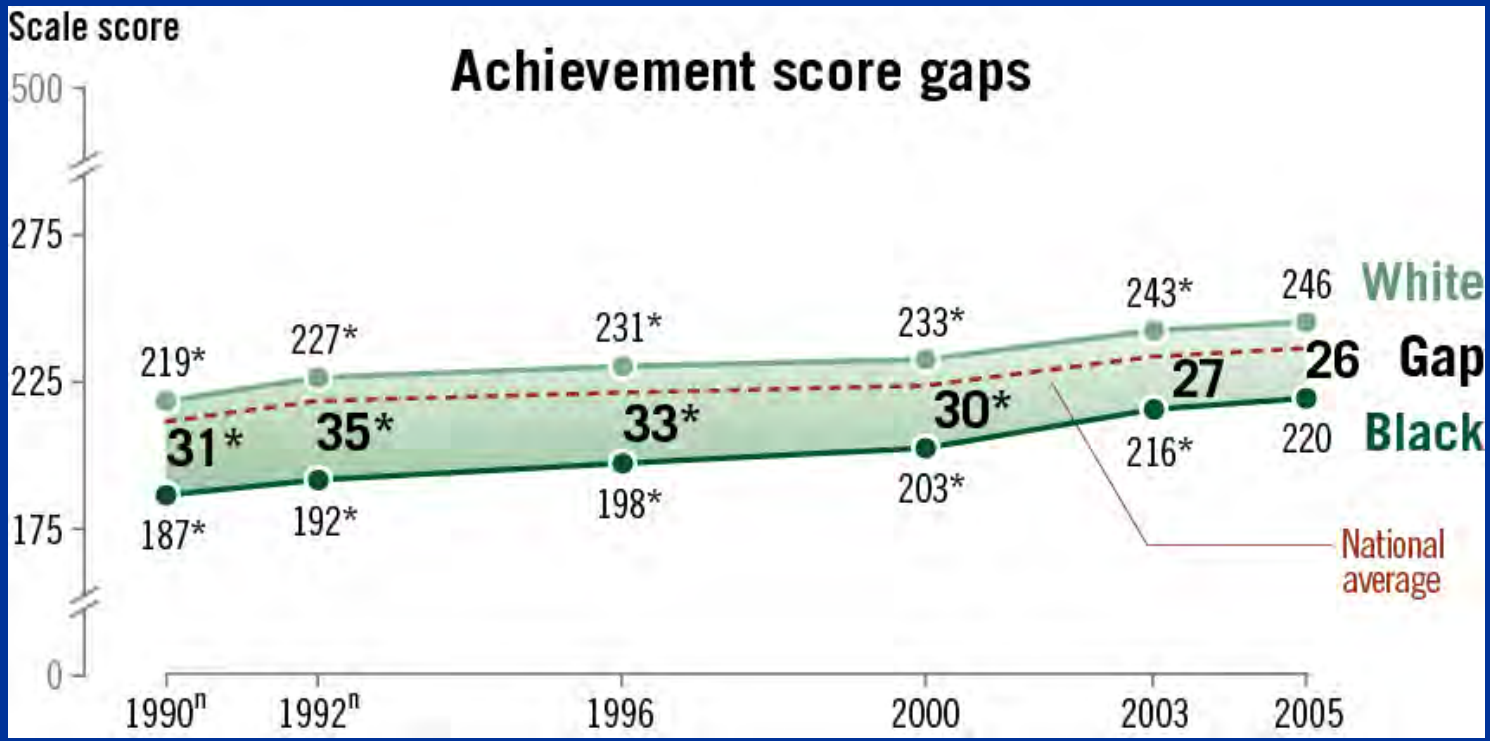
- **Negative**. The average score of the *higher* performing group declines over time, while the average score of the *lower* performing group does not show a change.
- **Very Negative**. The average scores of *both* groups decline over time, but the score of the *higher* performing group declines at an even faster rate.

National score trends and gap trends

- National trends between 1992 and 2005 in NAEP Reading achievement *scores*:
  - for 4th and 8th graders, scores increased for both Black students and White students
- National trends between 1990 and 2005 in NAEP Mathematics achievement *scores*:
  - for 4th and 8th graders, scores increased for both Black students and White students
- National trends in *score gaps*:
  - B-W reading gap_{2005} with B-W reading gap_{1992}
    - No change in gap for 4th graders or for 8th graders
  - B-W mathematics gap_{2005} with B-W mathematics gap_{1990}
    - Very positive narrowing of gap for 4th graders; no change in gap for 8th graders

NAEP math score achievement gaps

Black and White public school students at grade 4: Various years, 1990–2005



From Baldwin Anderson, J. (2006). NAEP Achievement Gaps: A framework for Evaluation. Presentation at the CCSSO Annual Large-Scale Assessment Conference, San Francisco, CA. An asterisk (*) indicates a statistically significant change.

So…

- Signal: “What is important?”
- Evaluate: “What do I know about how I did?”
- Inform: “What should I do to do better?”

Information

- Assessment is designed for a particular level of responsibility and action (national, state, district, school, classroom, individual)
- Assessment is designed for a particular function (signal, evaluate, inform)
- Interpreting assessment results for action requires a lot of contextual information

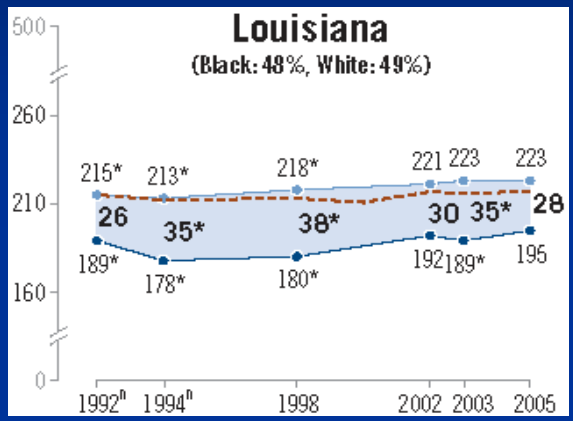
Some large-scale examples

- All are interesting, but all are limited in how they inform improvement

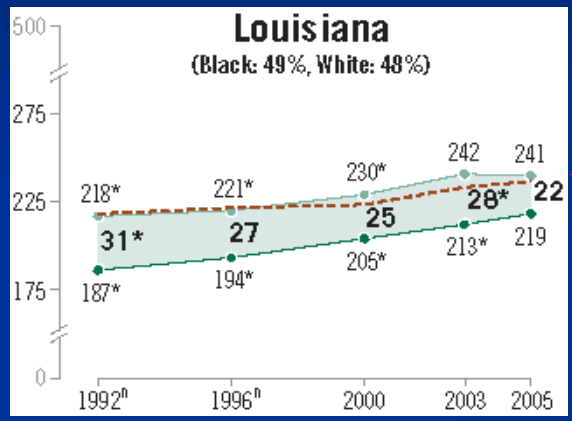
	Level of Action			
Function	National/ State	District	School	Classroom /Individual
Signal				
Evaluate				
Inform				

Examples of gap changes, State NAEP

4th Grade Reading

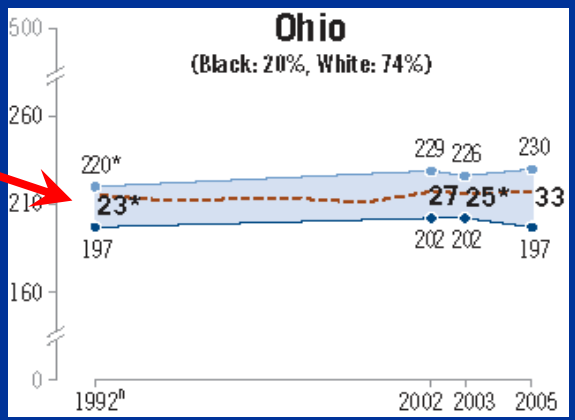


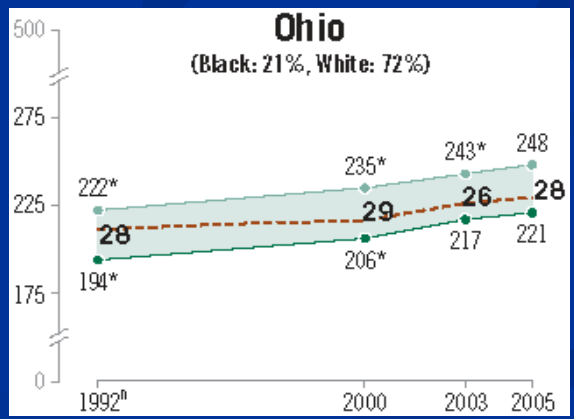
4th Grade Mathematics



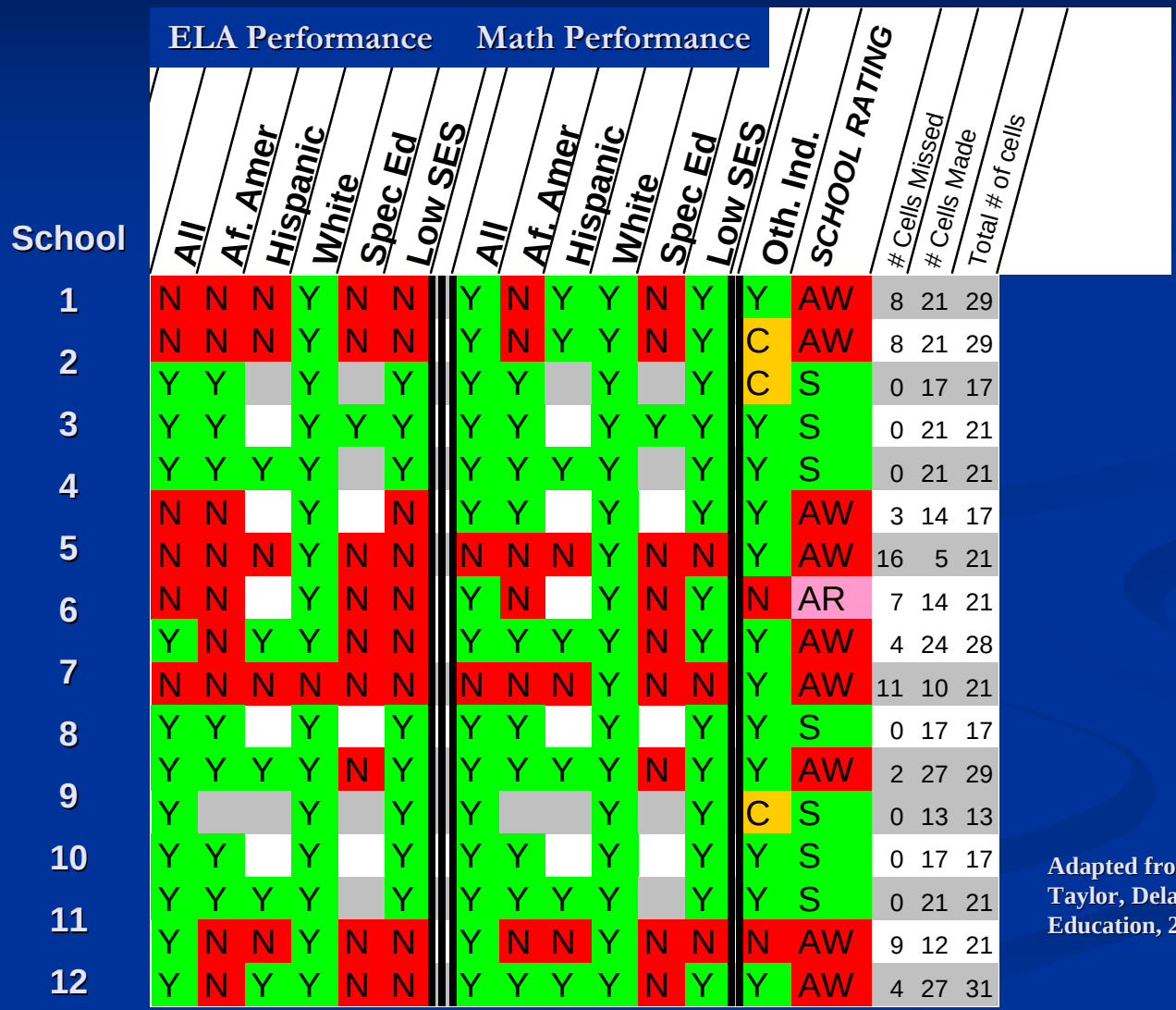
Gap decreased

Gap widened



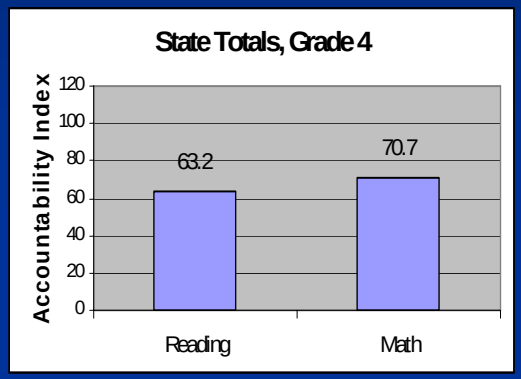


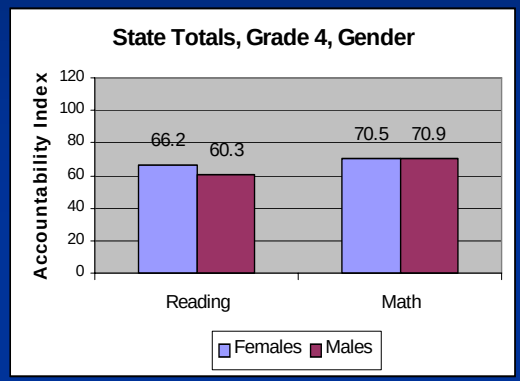
NCLB Subgroup Results, Delaware

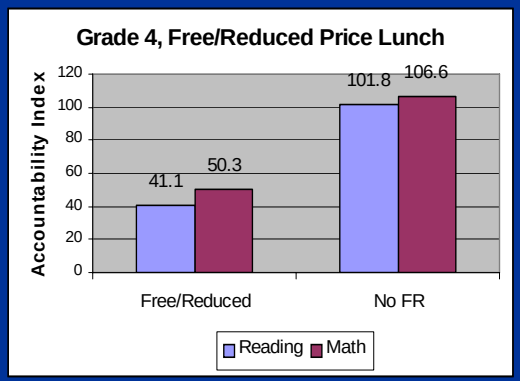


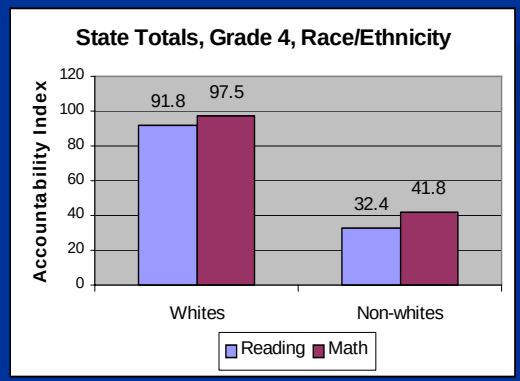
Adapted from: Robin, Taylor, Delaware Dept. of Education, 2008.

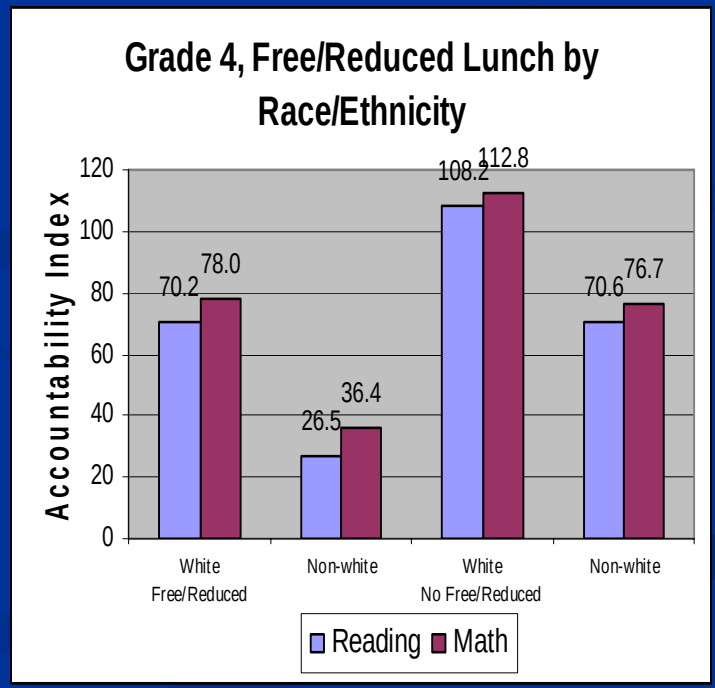
Ethnicity x SES Gaps, Louisiana



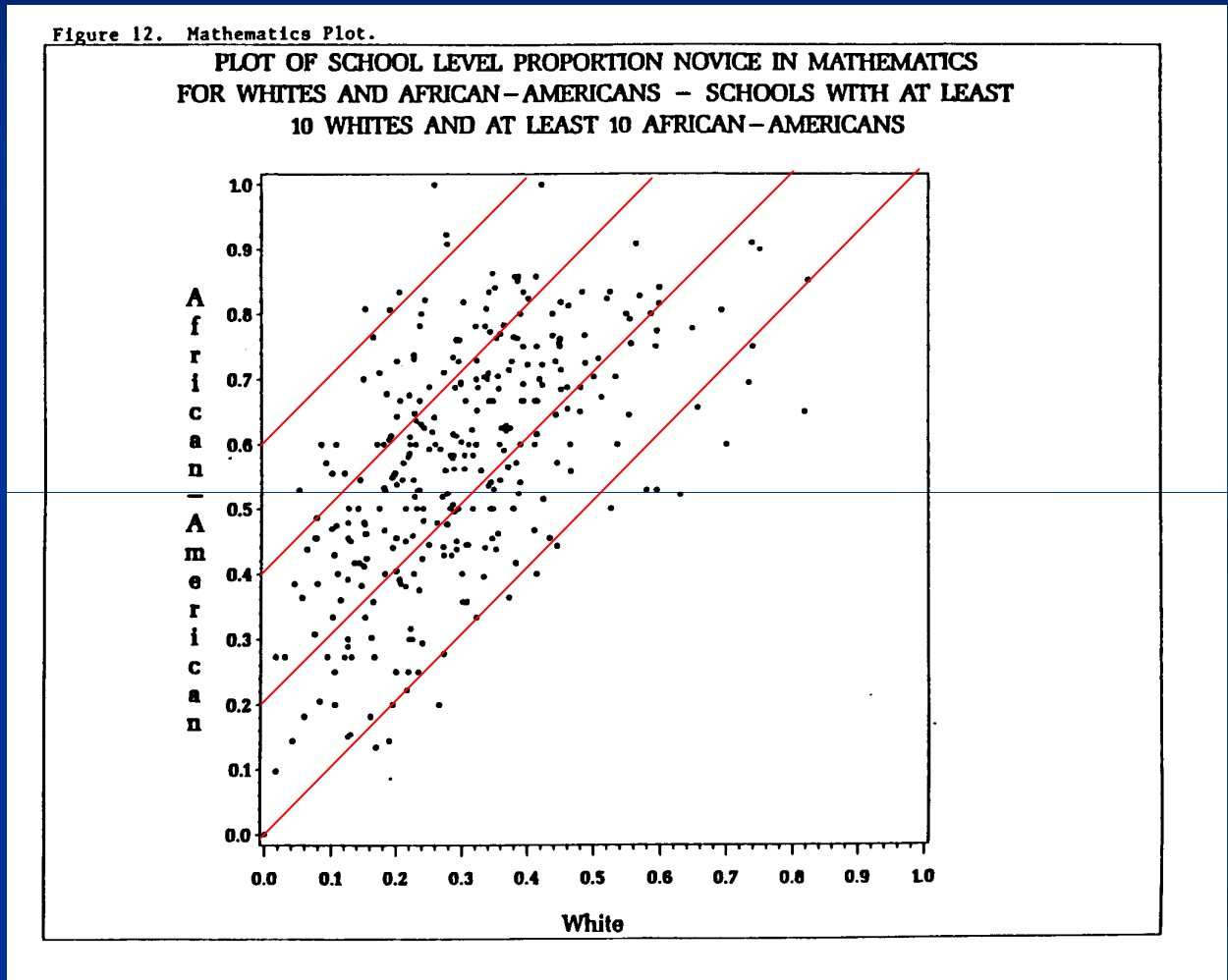








Ethnicity gaps, Kentucky

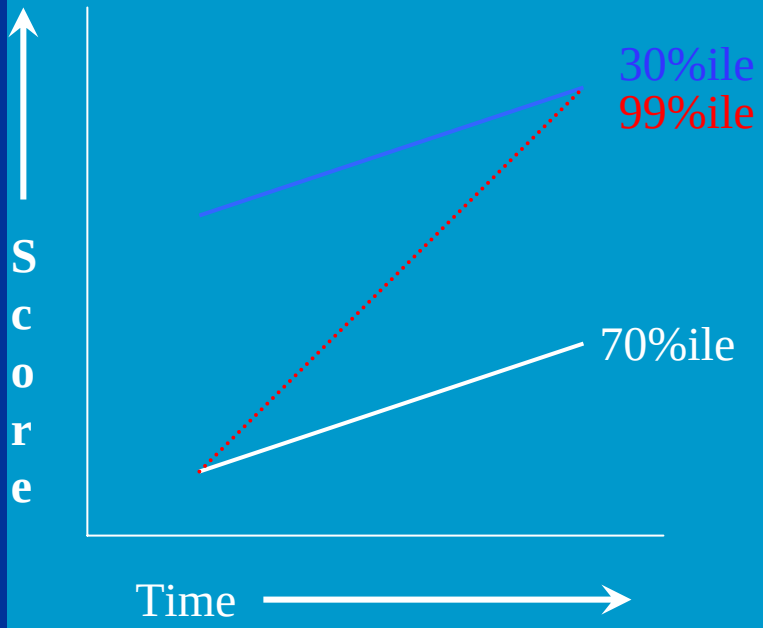


School Performance: Four Views

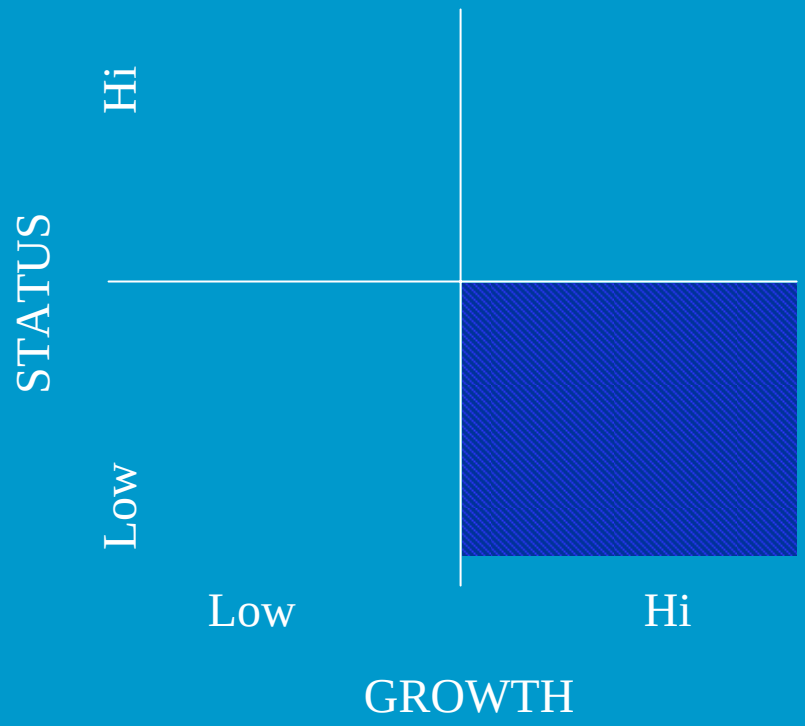
(Carlson, 2001; Gong, 2002)	Status	Change
Achievement	"Status": How high do students in this school score on state assessments?	"Improvement": Is the performance of successive groups increasing from one year to the next?
Effectiveness	"Growth": Are individual students learning as they progress from one grade to the next?	"Acceleration": Is the school becoming *more* effective or improving more rapidly?

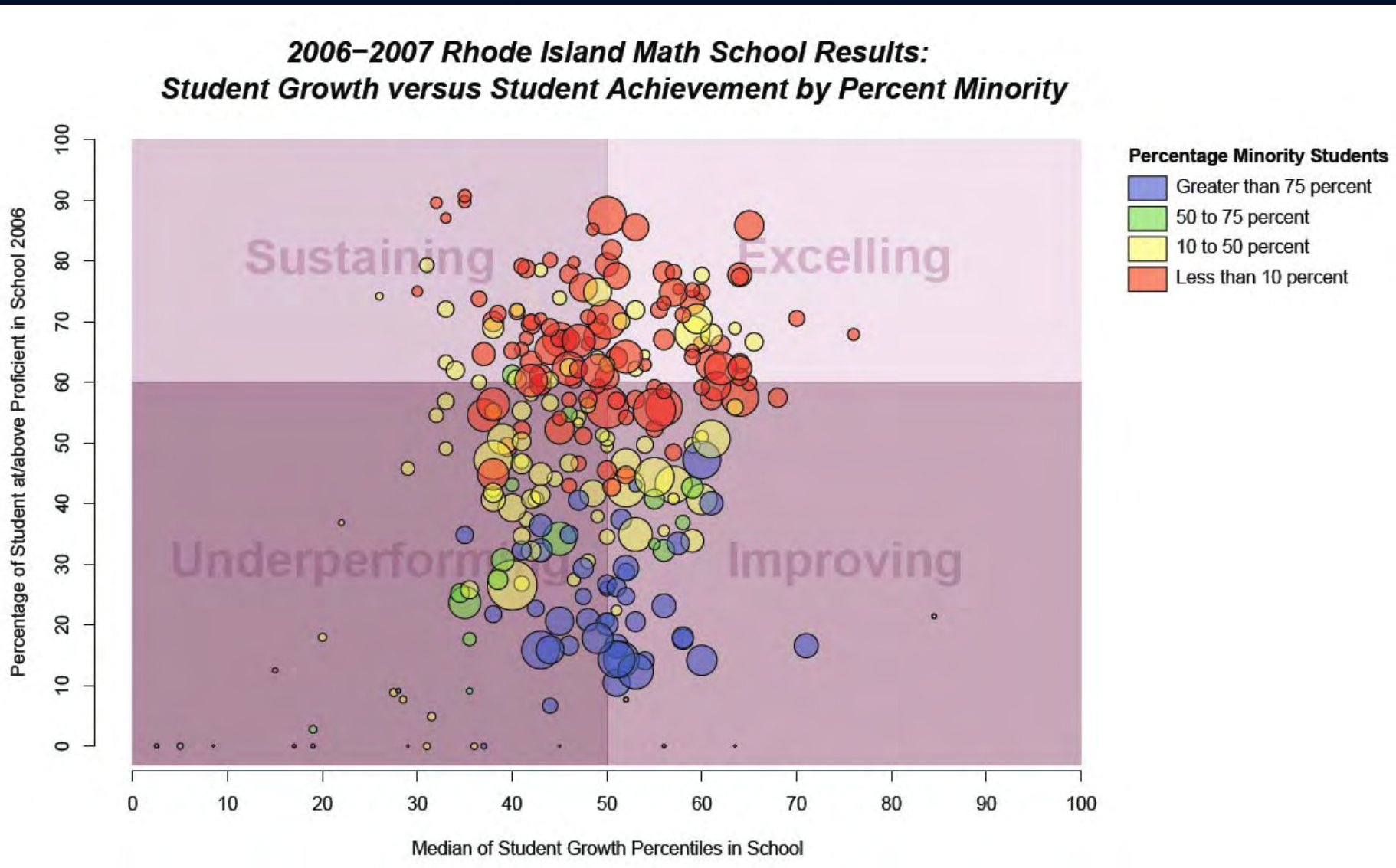
Status and Growth

"Effective school" for a student



Status vs. Growth





Betebenner, Jan. 2008, for RI project

Some national/state examples

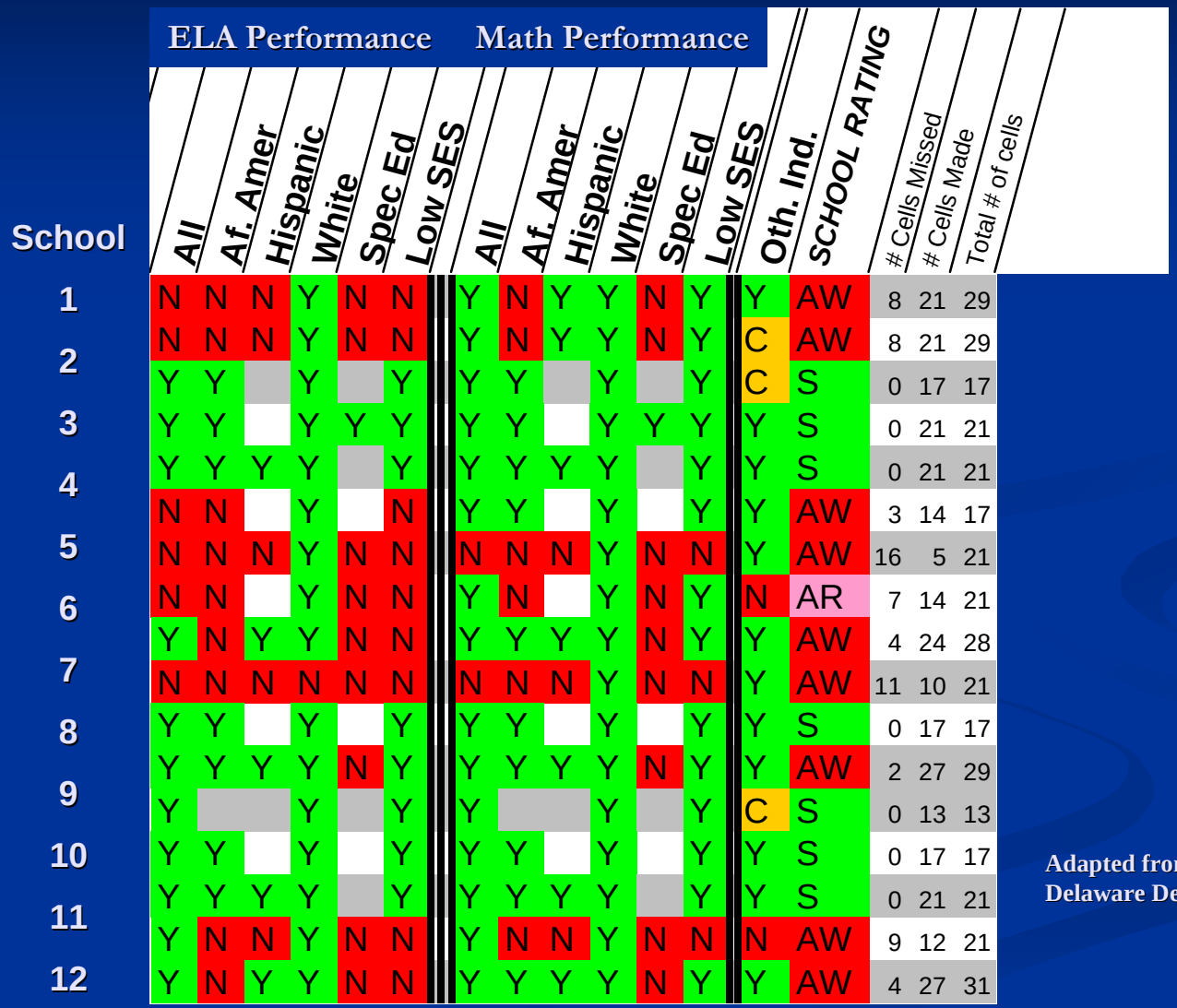
- How does the assessment information help? – very limited in usefulness to inform improvements at the local levels

	Level of Action			
Function	National/ State	District	School	Classroom /Individual
Signal	✓ ✓ ✓	✓ ✓	✓ ✓ ✓	✓ ✓
Evaluate	✓ ✓	✓	✓ ✓ ✓	
Inform	✓			

Some Examples: District & School

- Signal: “What is important?”
  - Longer-term outcomes
  - Shorter-term outcomes
  - Key processes under my control
- Evaluate: “What do I know about how I did?”
- Inform: “What should I do to do better?”

NCLB Subgroup Results, Delaware



Adapted from: Robin, Taylor, Delaware Dept. of Education, 2008.

Some District & School Actions

Reduce achievement gap in mathematics by

- Common district curriculum and pacing guide
- Common district interim assessment (several times per year)
- Attention to course enrollment patterns, credit (successful completion), and associated supports

Common Curriculum & Pacing

Scope & Sequence of Learning Targets

A B12 C1234 D12 E F123 G H123

Sept Oct Nov Dec Jan Feb Mar Apr May
Pacing of instruction

C_4, D_2,F_2, G, H_{13}

End-of-year Assessment

Design of Interim Assessments

- Assessments designed for different purposes – provide different information to signal, evaluate, and inform
  - Practice & Prediction
  - Curriculum Sensitivity
  - Instruction & Learning Targets (robust proficiency)

Design of Interim Assessments - 2

Sequence of Learning Targets

End-of-year Assessment

A B12 C1234 D12 E F123 G H123

C4, D2,F2, G, H13

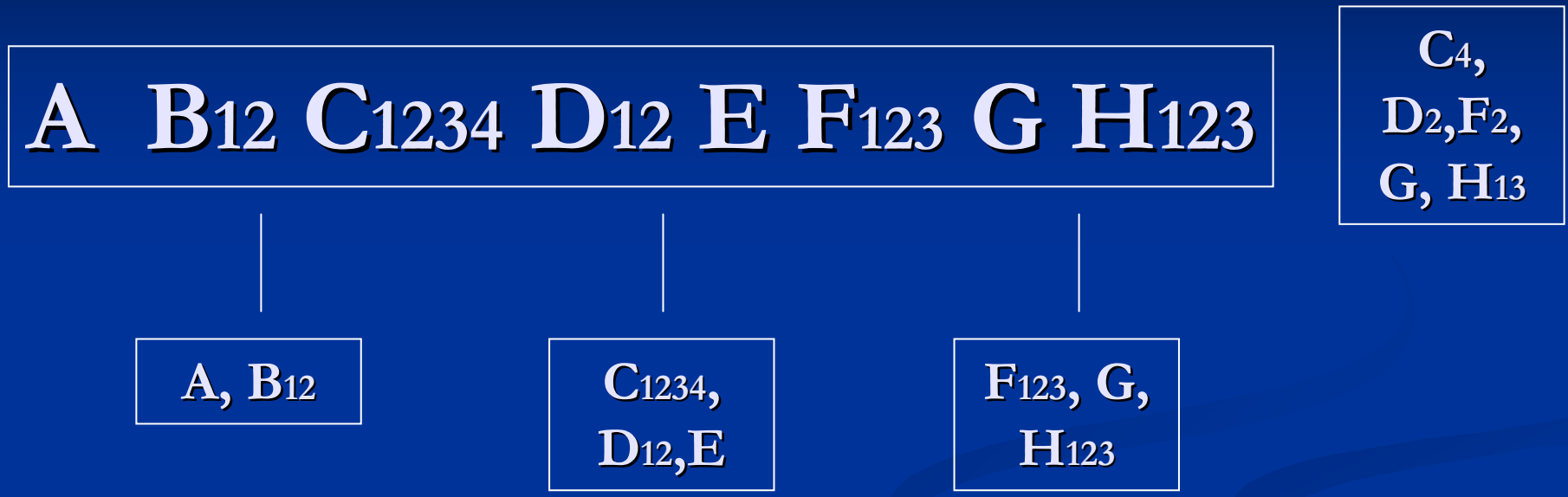
C4, D2,F2, G, H13

C4, D2,F2, G, H13

C4, D2,F2, G, H13

Predictive, Practice Interim Assessments

Design of Interim Assessments - 3



Recent Instruction

Design of Interim Assessments - 4

A B12 C1234 D12 E F123 G H123

C4, D2,F2, G, H13

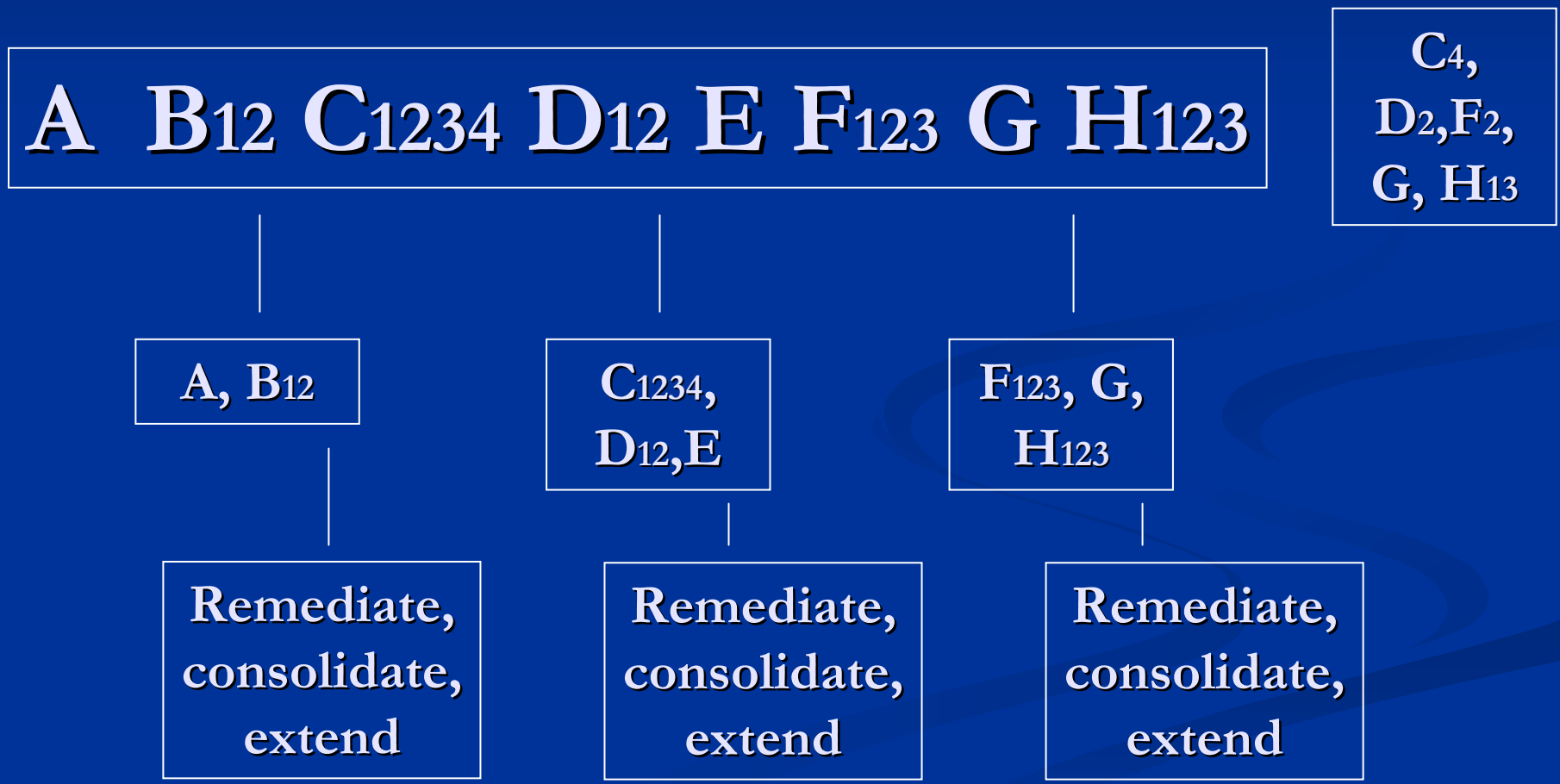
A, B12

A, B12, C1234, D12,E

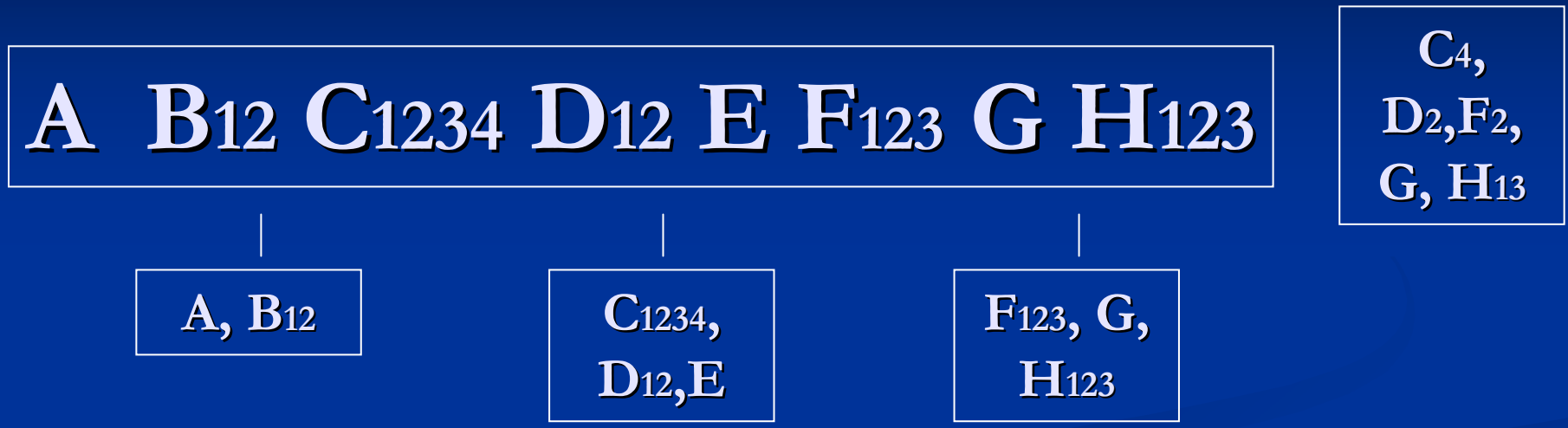
A, B12, C1234, D12,E, F123, G, H123

Cumulative Instruction

Assessment & Instruction Structure (Pacing incl. feedback)



Design of Interim Assessments – 5



- Illustrative only – should consider other designs for interim assessments, end-of-year test, and especially instructional sequence

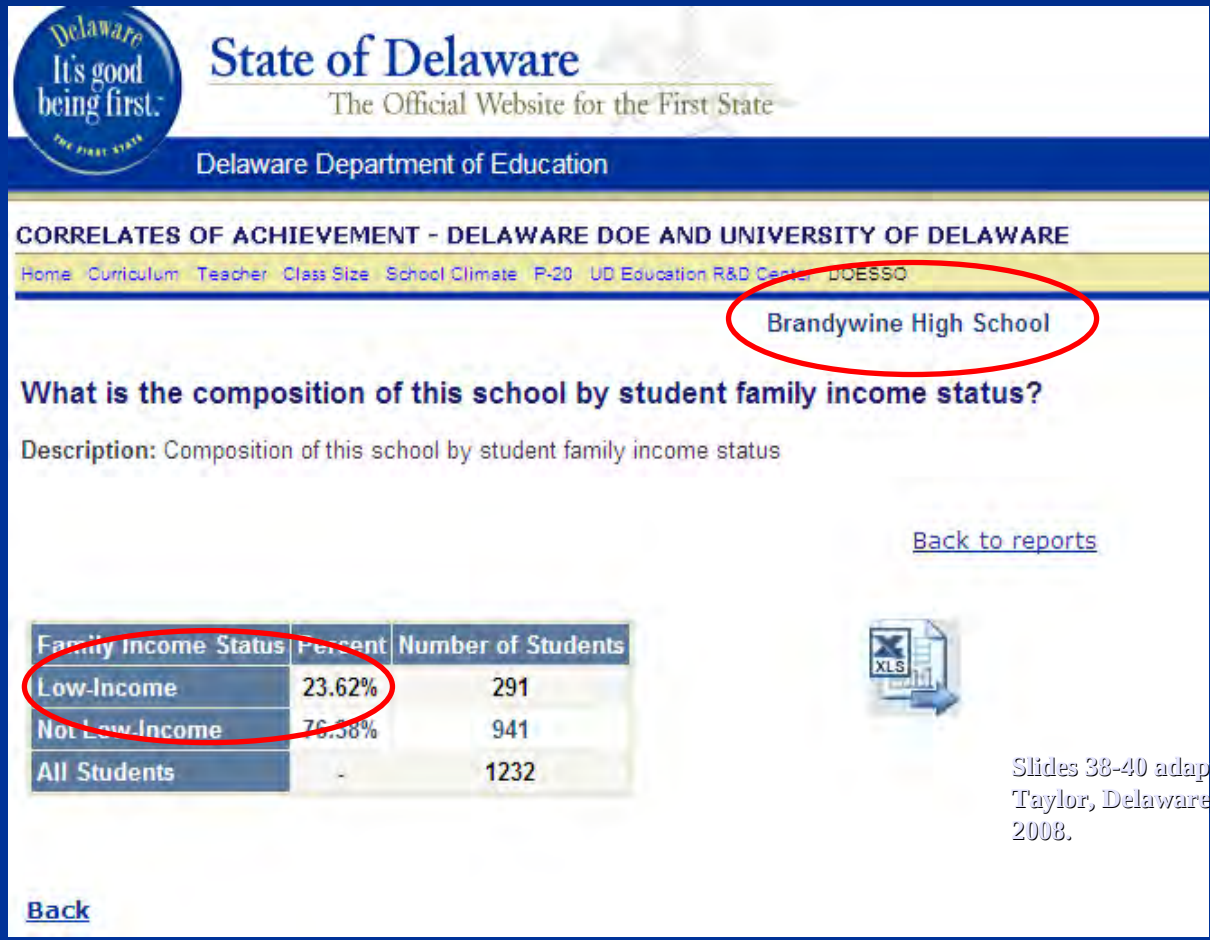
Some District & School Actions

Reduce achievement gap in mathematics by

- Common district curriculum and pacing guide
- Common district interim assessment (several times per year)

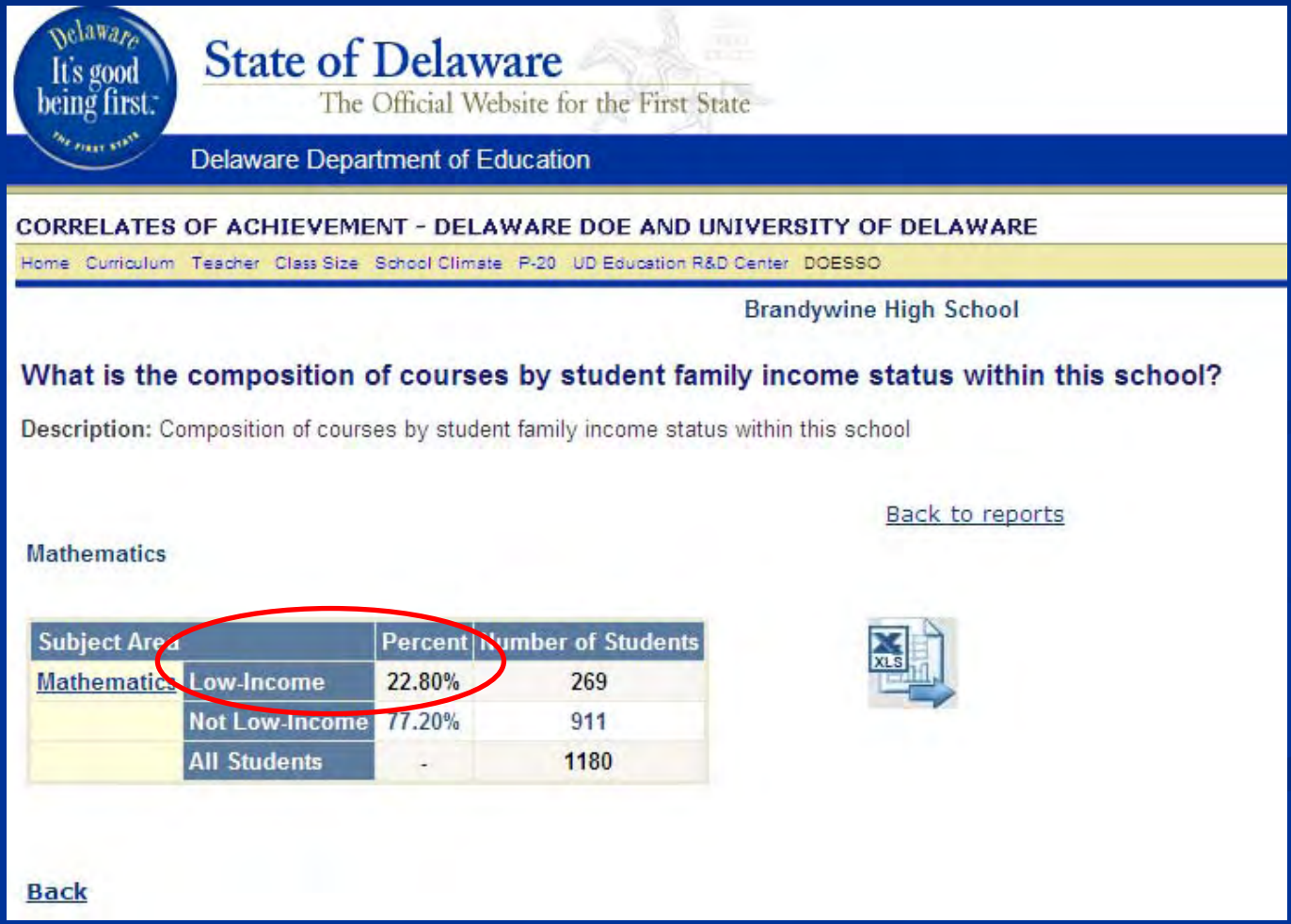
- Attention to course enrollment patterns, credit (successful completion), and associated supports

About 24% of students enrolled are from low-income families



Slides 38-40 adapted from: Robin, Taylor, Delaware Dept. of Education, 2008.

Low Income Students Enrolled in Math Classes – about 23%



State of Delaware
The Official Website for the First State
Delaware Department of Education

CORRELATES OF ACHIEVEMENT - DELAWARE DOE AND UNIVERSITY OF DELAWARE

Home Curriculum Teacher Class Size School Climate P-20 UD Education R&D Center DOESSO

Brandywine High School

What is the composition of courses by student family income status within this school?

Description: Composition of courses by student family income status within this school

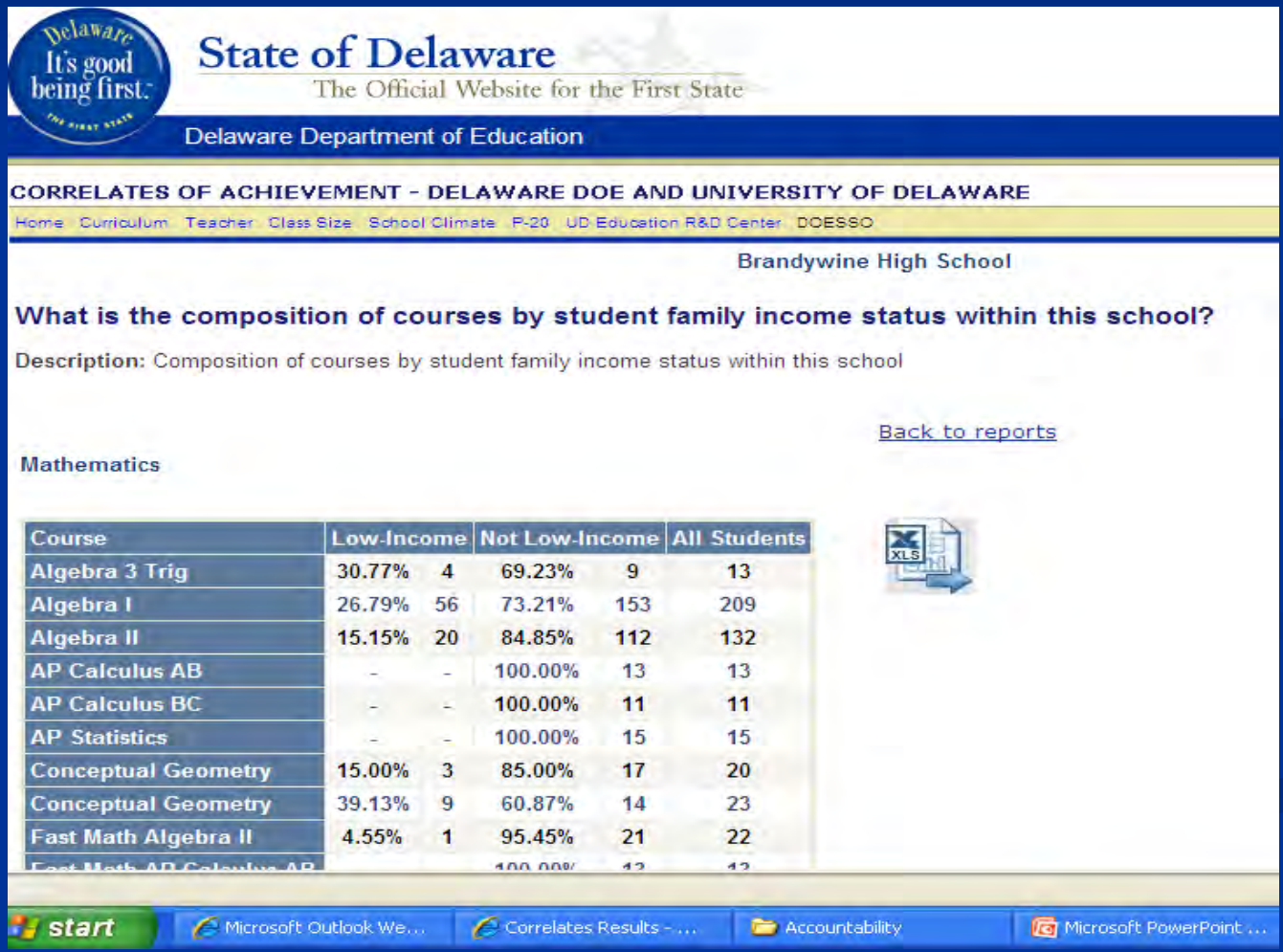
Back to reports

Mathematics

Subject Area		Percent	Number of Students
Mathematics	Low-Income	22.80%	269
	Not Low-Income	77.20%	911
	All Students	-	1180

Back

Low Income Students Enrolled in Lower, Fewer in Higher Classes



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Back to reports

Mathematics

Course	Low-Income		Not Low-Income		All Students
Algebra 3 Trig	30.77%	4	69.23%	9	13
Algebra I	26.79%	56	73.21%	153	209
Algebra II	15.15%	20	84.85%	112	132
AP Calculus AB	-	-	100.00%	13	13
AP Calculus BC	-	-	100.00%	11	11
AP Statistics	-	-	100.00%	15	15
Conceptual Geometry	15.00%	3	85.00%	17	20
Conceptual Geometry	39.13%	9	60.87%	14	23
Fast Math Algebra II	4.55%	1	95.45%	21	22

start | Microsoft Outlook We... | Correlates Results - ... | Accountability | Microsoft PowerPoint ...

Some district examples

- How does the assessment information help? – still not very helpful in informing classroom learning

	Level of Action			
Function		District	School	Classroom /Individual
Signal	Outcomes / Processes	✔ ✔	✔ ✔ ✔	✔ ✔ ✔
Evaluate	Outcomes / Processes	✔	✔ ✔ ✔	✔ ✔ ✔
Inform	Outcomes / Processes			

Some Examples: School & Classroom/Individual

- Signal: “What is important?”
  - Shorter-term outcomes
  - Key processes – developmental learning
- Evaluate: “What do I know about how I did?”
  - Why?
- Inform: “What should I do to do better?”
  - Short timelines; must involve students

Content: Developmental "Learning Progressions"
Examples

Mathematics: Fractions

- Partition an area into parts
- Identify the fraction described by the partitioned area
- Find the fractional part of a whole

Reading: Vocabulary Development

- Recognize & learn words
- Recognize & learn related words (e.g., synonym, antonym)
- Use word structure to determine meaning
  - syllables
  - base words and affixes
- Use context to determine meaning
  - intended meaning
  - multiple meanings

Source of slides 43-49: K. Hess. (2008). Using Learning Progressions to Define "Good Enough" Performance for Alternate Assessment Students. Presentation at annual CCSSO conference.

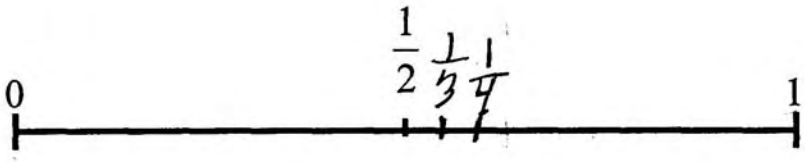
A Math Example

- Start with an existing curricular learning progression
- Use Formative Assessment to validate the LP range and later to monitor progress
  - "Place 1/3 and 1/4 in the correct position on the number line. Explain your answers using words and diagrams." (source VT Mathematics Partnership/ OGAP)

Action Research/Formative Assessment: Short constructed response that elicits application & conceptual thinking…

Place $\frac{1}{3}$ and $\frac{1}{4}$ in the correct location on the number line below.

Explain your answer using words or diagrams.



I chose these spots because, it says $\frac{1}{2}$, and then $\frac{1}{3}$ comes after $\frac{1}{2}$, and then $\frac{1}{4}$ after $\frac{1}{3}$ because it goes 1, 2, 3, 4, and so that is how I think.

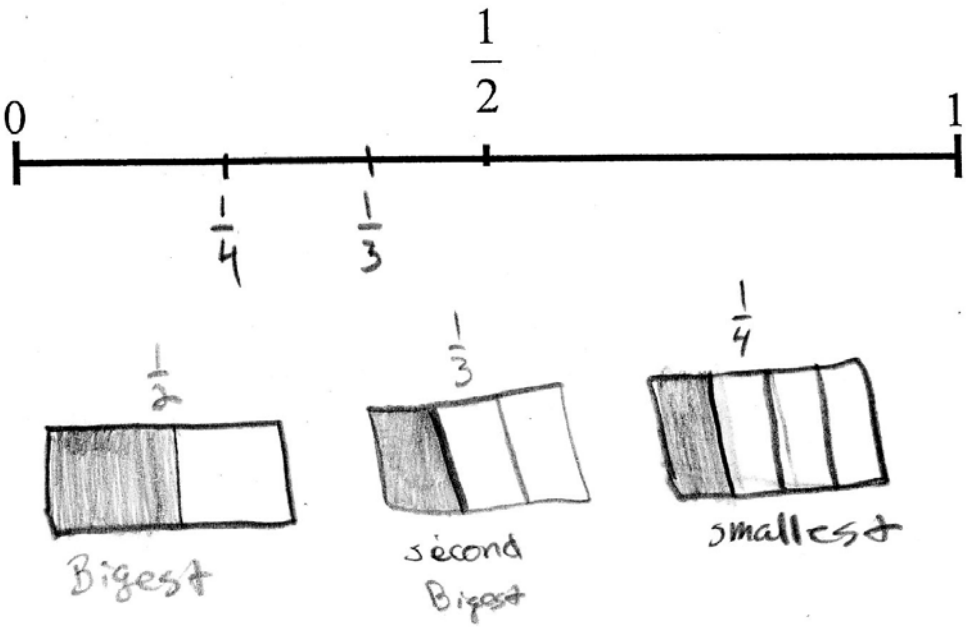
What understandings are evidenced in this student's work?

Source: Vermont Mathematics Partnership/OGAP

Formative Assessments help to develop or validate the LP range and later to monitor progress

Place $\frac{1}{3}$ and $\frac{1}{4}$ in the correct location on the number line below.

Explain your answer using words or diagrams.



What understandings are evidenced in this student work *that are different*?

What are some potential next instructional steps based on the evidence?

Source: Vermont Mathematics Partnership/OGAP

LP Refined/Expanded (with Action Research):

BEFORE

- ?
- Partition an area into parts
- Identify the fraction described by the partitioned area
- Find the fractional part of a whole

AFTER

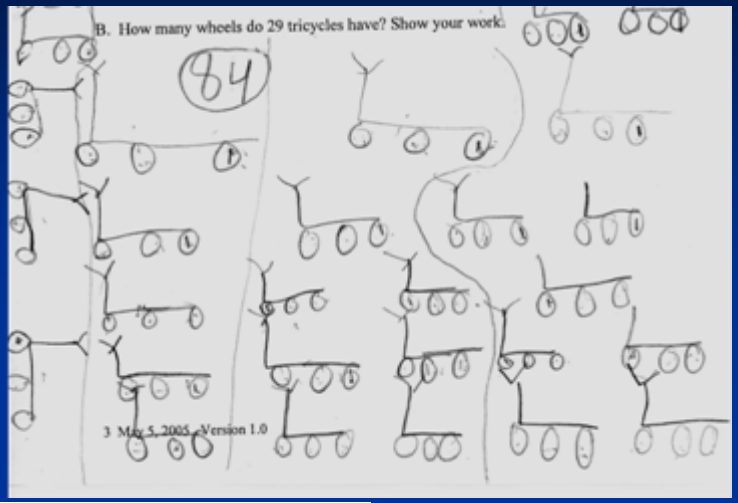
- Understand the difference between whole and part
- Show that one meaning of fractions is *as a value* (student often sees fractions as two whole numbers)…
  - Locate a fraction on a number line
  - Represent a fraction with a set of objects or on an area models
  - Operate with fractions – e.g., use models to compare
- Knowing when whole number reasoning is not appropriate
- **Partition an area** or set of objects or number line **into parts**

"Refined/Expanded" in…

- Breadth of Content (e.g., more ways to represent data; more/different text features)
- Deepening or generalizing understanding of the same content (e.g., topic of text, topic sentence, main idea, author's message)
- Use of more sophisticated reasoning
  - Flexible use of reading strategies to make meaning (e.g., is there more than way to figure out the meaning of a word?)
  - Additive to transitional to multiplicative reasoning (see next slide) – not about just getting the right answer!

One tricycle has three wheels.

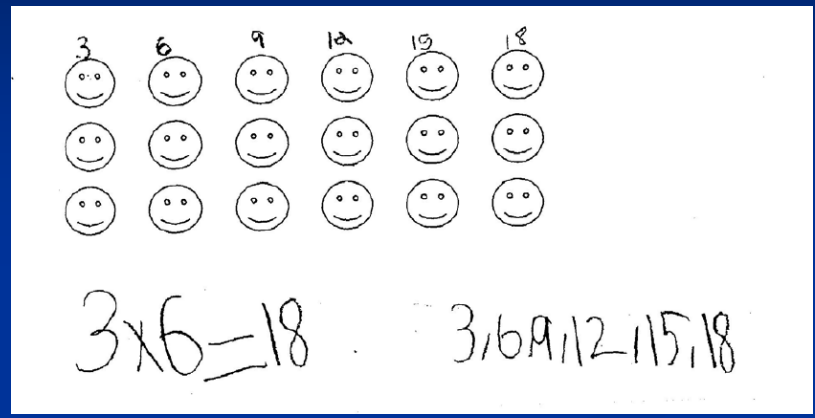
How many wheels do 29 tricycles have?



Additive Strategy

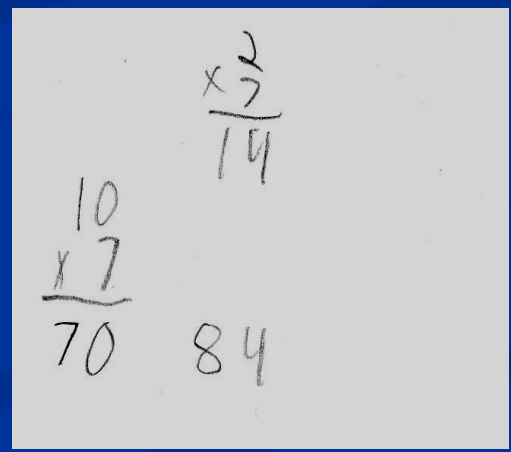
Transitional Multiplicative Strategy

Write an equation to match this picture.



Multiplicative Strategy

Farmer Brown donated 7 dozen eggs to the senior center.
How many eggs did he donate?



Achievement Gaps

- Need powerful conceptions of learning (beyond drill-and-practice)
- Need coherent means of assessment
- Need comprehensive systems to put assessment information into constructive action
- Comprehensive Systems approach
  - Not just better large-scale assessment
  - Not just better scores on a test
  - Not just better NCLB-type accountability

Promising Challenges

- **Anchor desired knowledge and skills in valued performances and abilities**
- **Articulate content standards so they are coherent and can guide teaching and learning better (debate place of local curriculum)**
- **Revisit balance between standardization and flexibility to make assessment valuable (signal, evaluate, inform) across different levels**
- **Develop policy and roles for all levels, not just states**

For more information:

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