

Content Maps and Measures of Alignment for Middle School Mathematics

The charts on the following pages present ‘pictures’ or descriptions of instructional and assessment content for grade 8 mathematics. The descriptions are presented in the form of ‘topographic’ maps, which provide a powerful graphic portrayal of data arrayed in a three dimensional space. The data upon which these content ‘maps’ are constructed are based in a three-dimensional construct for describing instructional content. One of these three dimensions is simply ‘amount of time’ spent in one topic domain relative to another. This dimension is reported as “percent of instructional time” or “percent of assessment score” depending upon whether it is describing instructional practice or the content contained in an assessment. The other two dimensions for describing content are 1) topics and 2) cognitive demand.

The taxonomy presumes that any given element of instructional content can be described in terms of the intersection of these two dimensions. For example, a test item or a lesson plan may be largely focused on the topic area of measurement. However, this information alone tells one only so much about the item or lesson itself. Is the lesson primarily concerned with providing students an opportunity to learn the terms associated with various measurement systems? Or does the lesson (or test item) require students to formulate some hypothesis, conduct a laboratory investigation, or make some calculation based upon measurement? The cognitive demand dimension offers six categories into which any of the eighty-four topics listed for middle school mathematics can be further distinguished. Thus elementary science is described using a two dimensional matrix consisting of eighty-four rows (topics) by six columns (cognitive demand), yielding a total matrix consisting of 504 unique topic by cognitive demand cells. Into each cell is entered a number representing the proportion of overall emphasis of instruction or an assessment that cell contributes to the overall content being described. It is this data set from which the content maps are constructed.

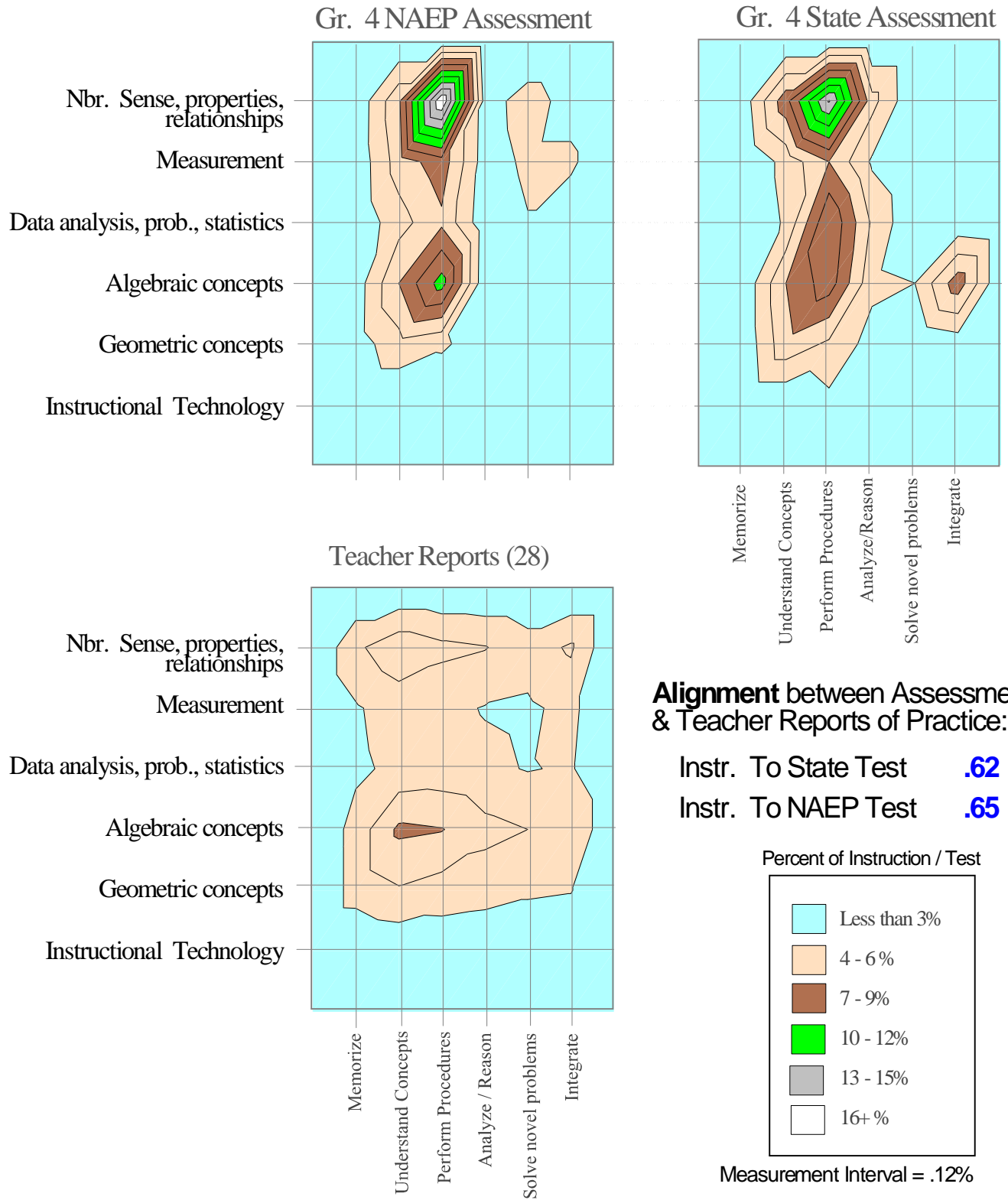
Topics are organized into two levels of grain size for middle school mathematics. The 504 cells described above represent the finest grain level of description, and is the level at which the data is collected. For ease of reporting, this fine grain data can be aggregated up to large grain ‘chunks’. The eighty-four unique topics are grouped into six ‘topic areas’, with each topic area made up of from three to twenty-one topics. The topic areas are 1) Number sense, properties, and relationships, 2) Measurement, 3) Data analysis, probability, statistics, 4) Algebraic concepts, 5) Geometric concepts, and 6) Instructional technology.

The maps are linked so that the reader may jump between grain sizes. Move to finer grain descriptions by clicking the relevant topic area label or section of the map. Use the arrow in the bottom left corner to move up a level of grain size.

Alignment measures calculate the extent of agreement between two content embedded descriptions (generally instruction to assessment, though alignment can be measured between two assessment instruments or between two descriptions of practice). On the following pages, alignment measures are reported for NAEP to instruction and state assessment to instruction. The numbers reported for a given page are based on the data for that page. That is to say, in interpreting an alignment measure one would read the information as: For that portion of content focused on ‘X’ (given in title of chart), there is a .nn level of agreement between the instruction and assessment being reported. Alignment measures range from 0 to 1, with zero representing no alignment, and 1 representing perfect alignment.

Grade 8 Mathematics Large Grain Content Maps

Click on topic area label or map area to see finer grain size.

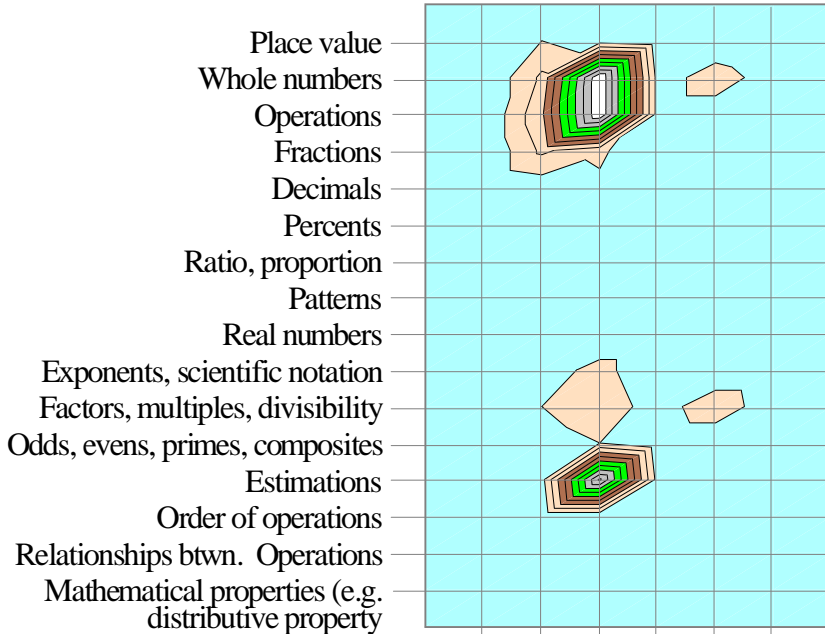


Grade 8 Mathematics

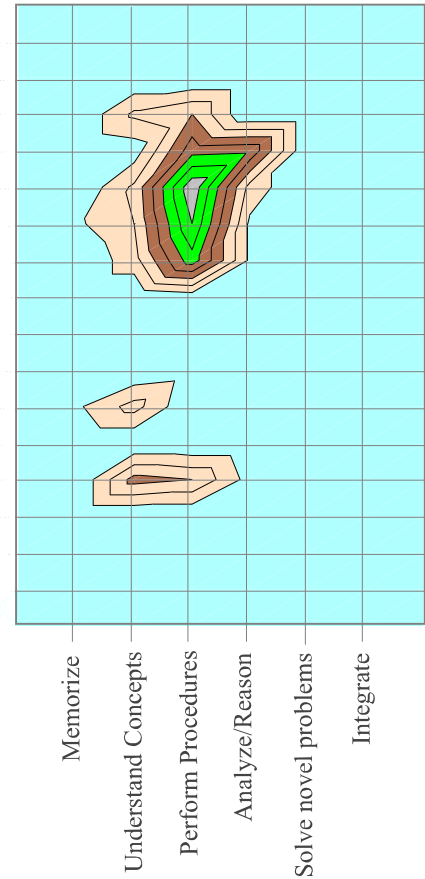
Number sense, properties, relationships

Fine Grain Content Maps

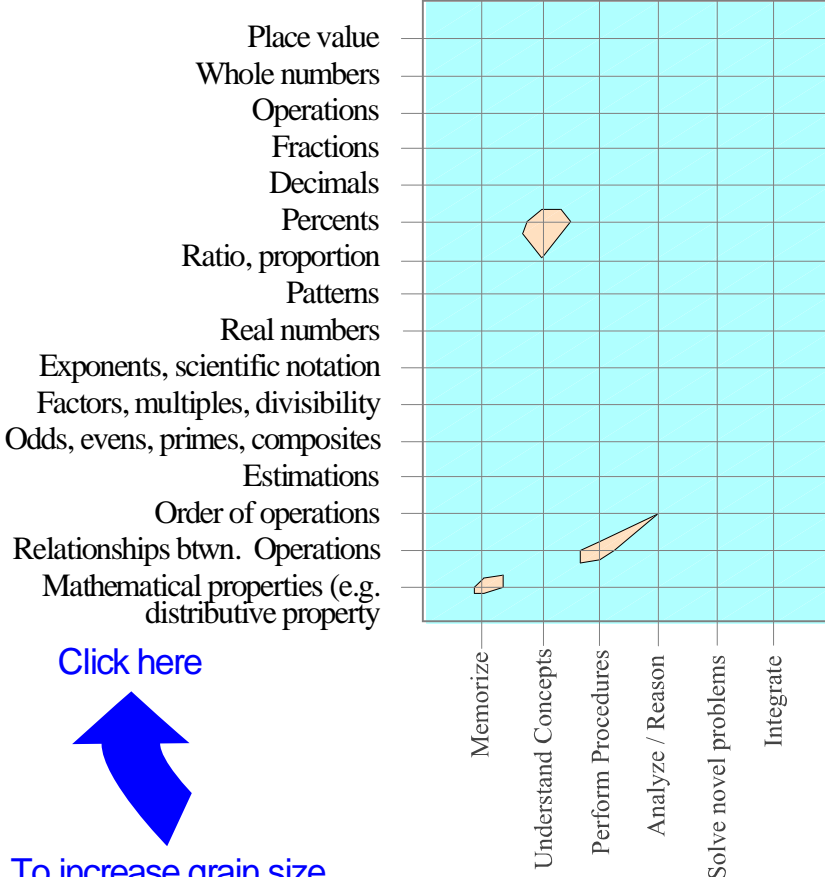
Gr. 8 NAEP Assessment



Gr. 8 State Assessment



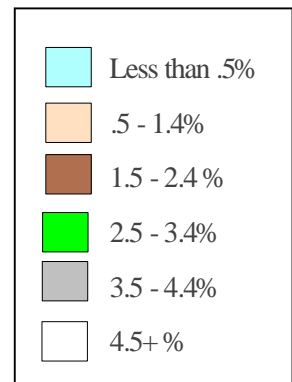
Teacher Reports (28)



Alignment between Assessment & Teacher Reports of Practice:

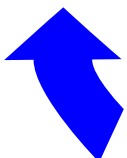
Instr. To State Test **.33**
 Instr. To NAEP Test **.34**

Percent of Instruction / Test



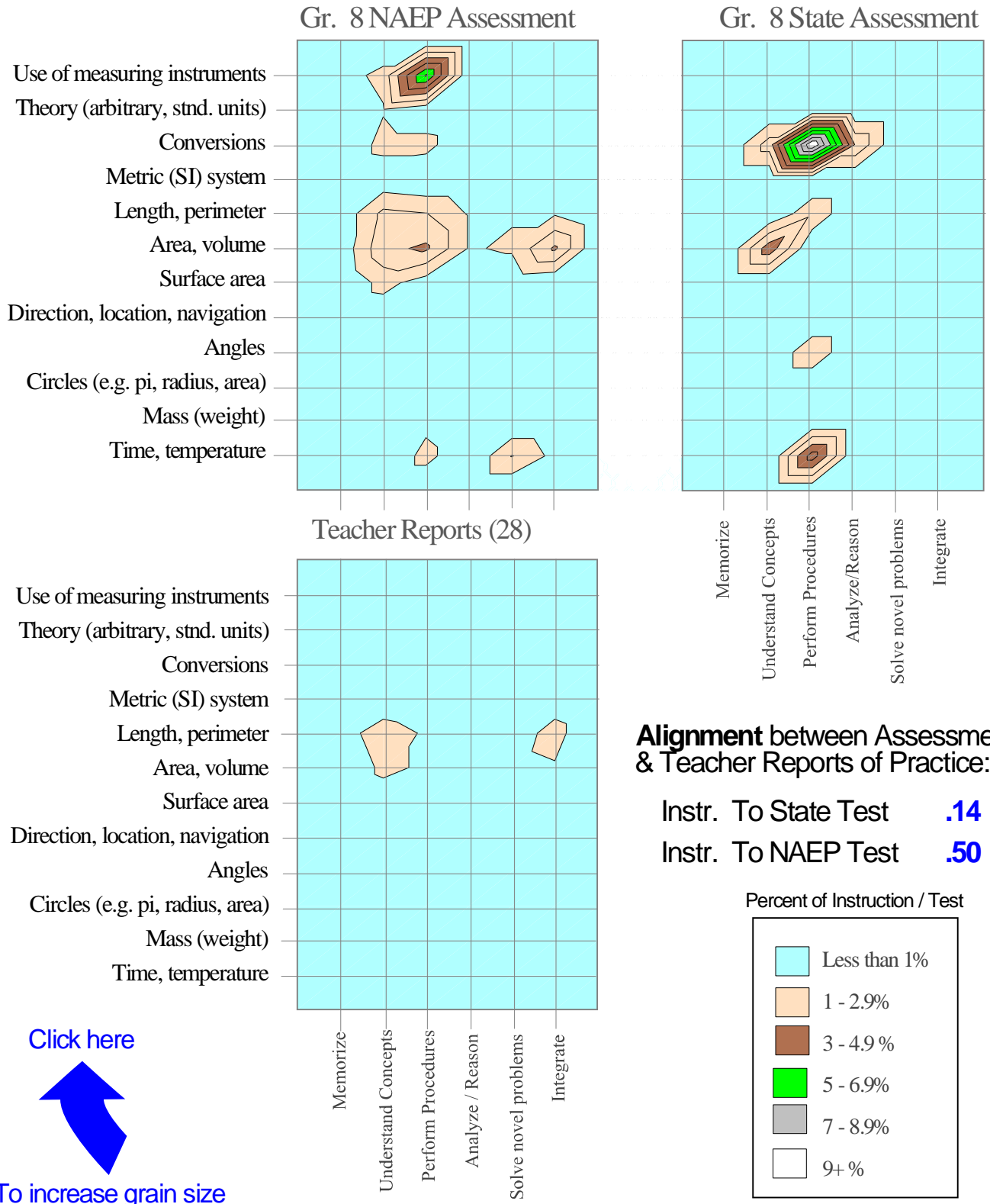
Measurement Interval = 1/2%

[Click here](#)

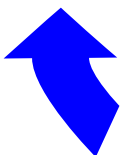


To increase grain size

Grade 8 Mathematics Measurement Fine Grain Content Maps

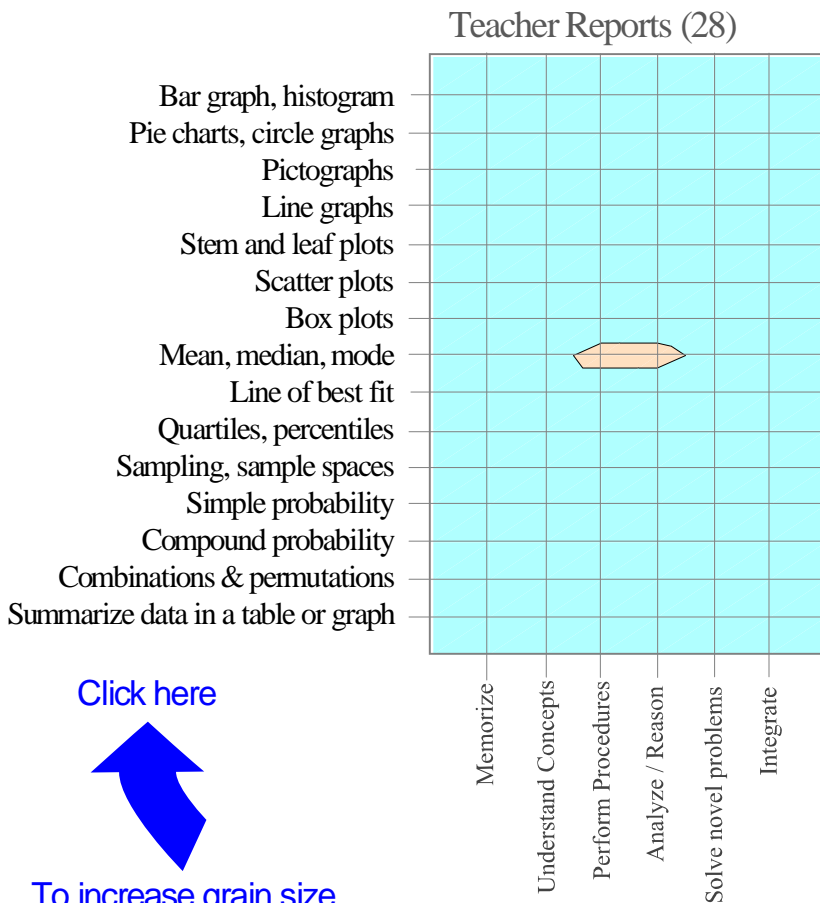
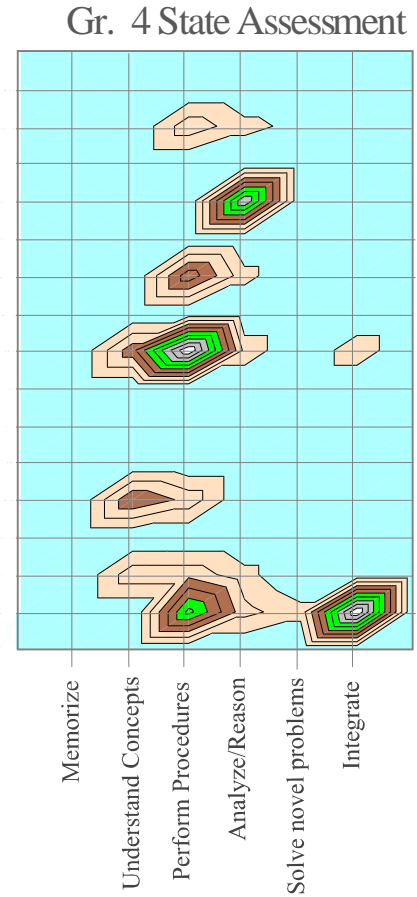
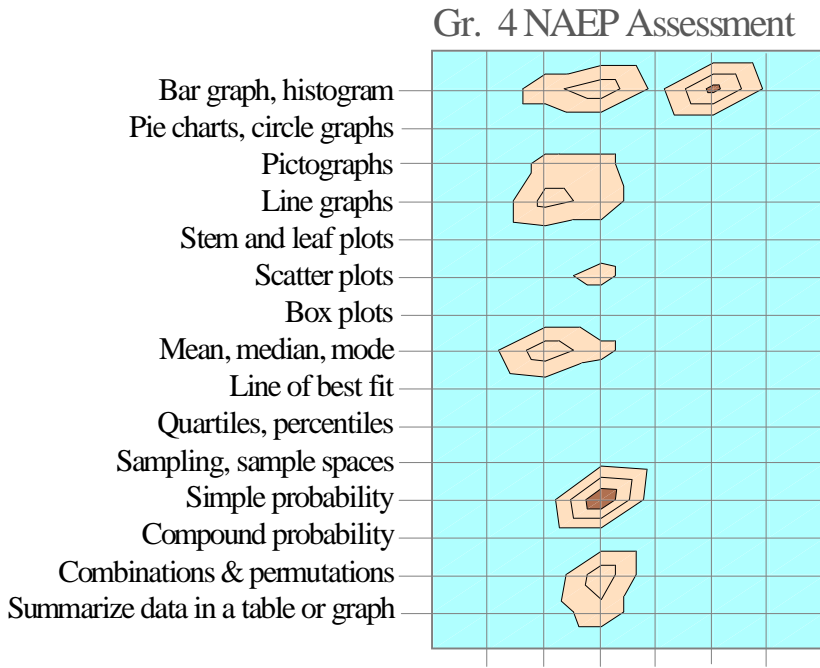


[Click here](#)



To increase grain size

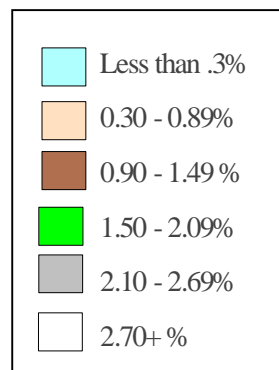
Grade 8 Mathematics Data Analysis, Probability, Statistics Fine Grain Content Maps



Alignment between Assessment & Teacher Reports of Practice:

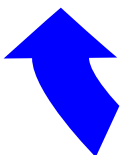
Instr. To State Test **.29**
Instr. To NAEP Test **.45**

Percent of Instruction / Test



Measurement Interval = 0.3%

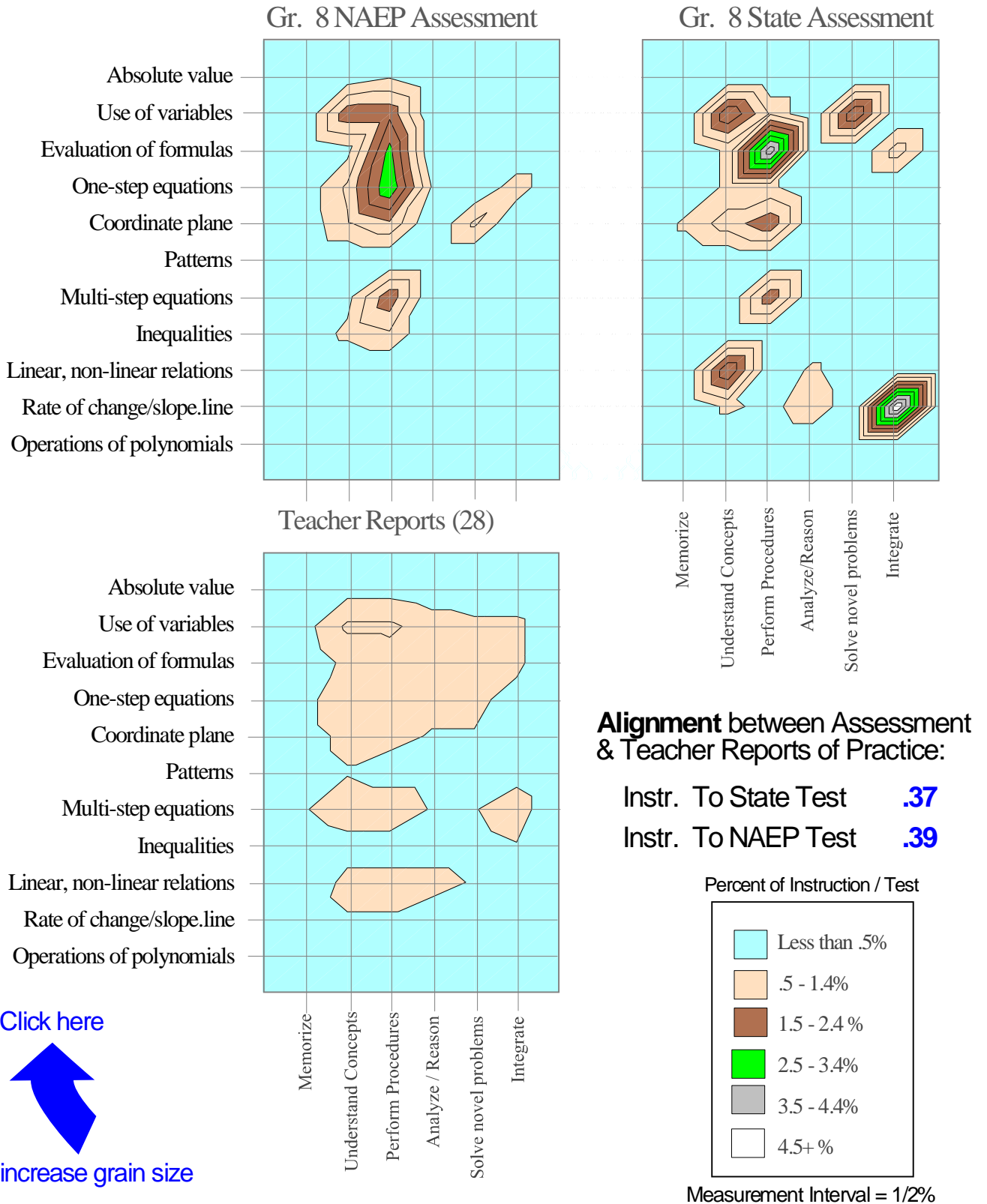
[Click here](#)



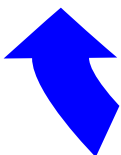
To increase grain size

Grade 8 Mathematics Algebraic Concepts (1) Fine Grain Content Maps

More Algebraic concepts on next page.



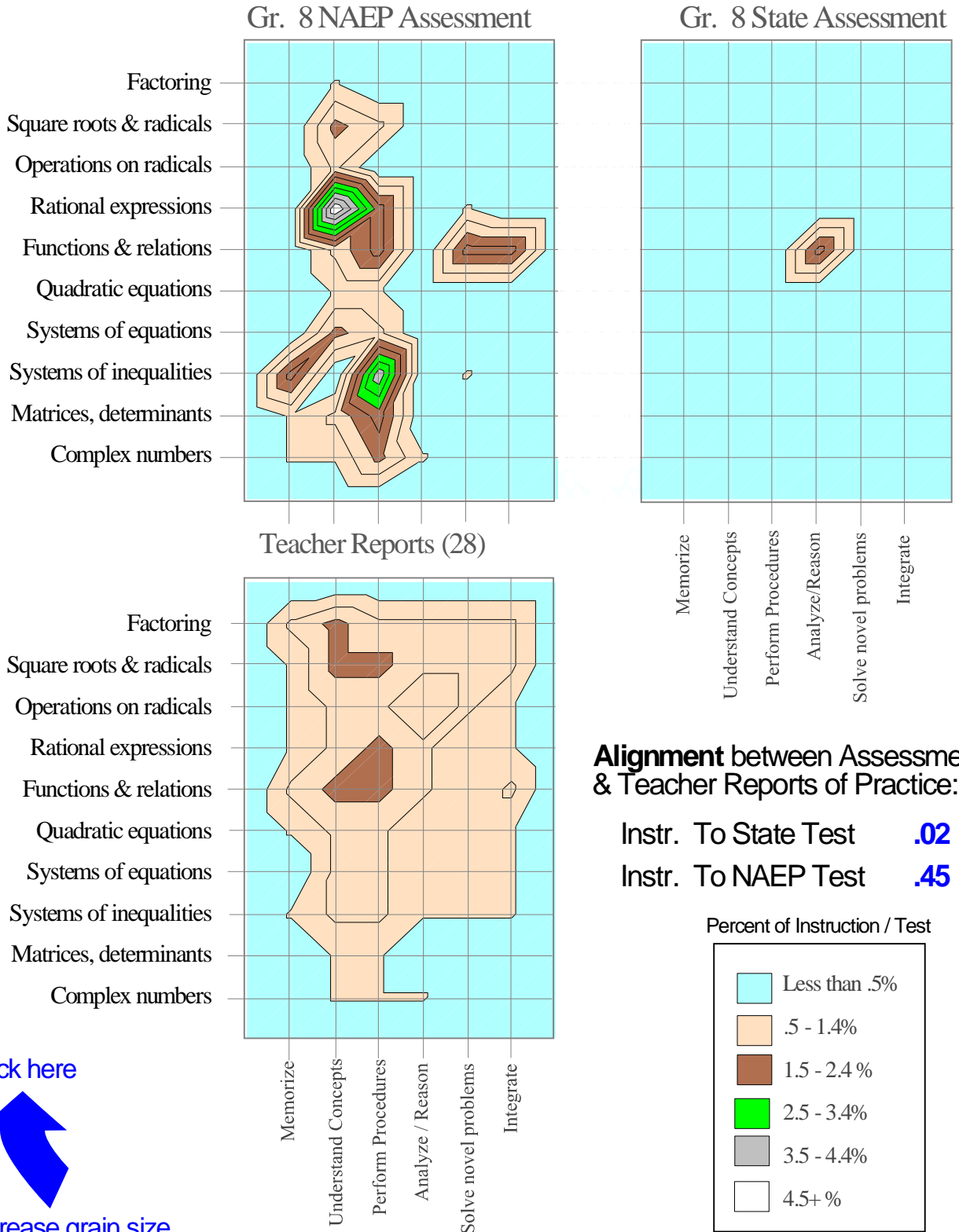
Click here



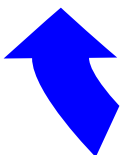
To increase grain size

Grade 8 Mathematics Algebraic Concepts (2) Fine Grain Content Maps

[More Algebraic concepts on previous page.](#)



[Click here](#)

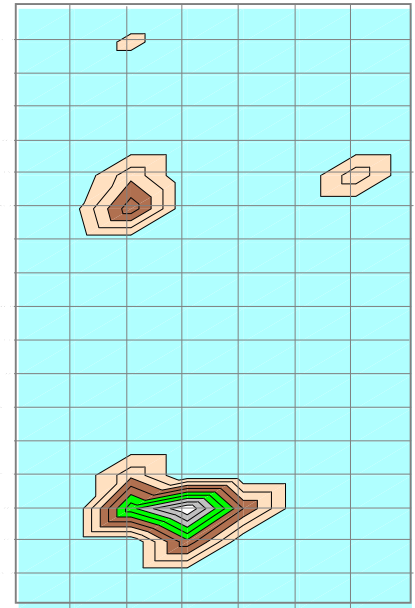
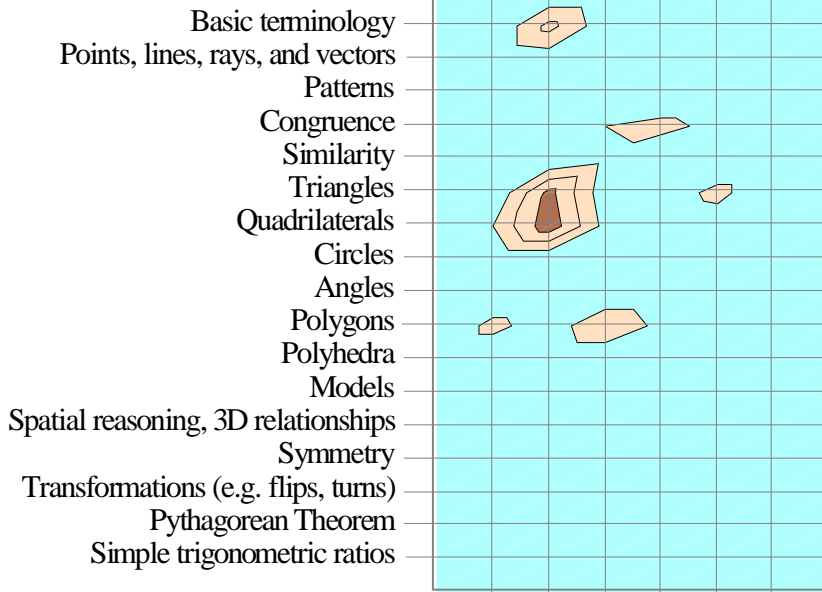


To increase grain size

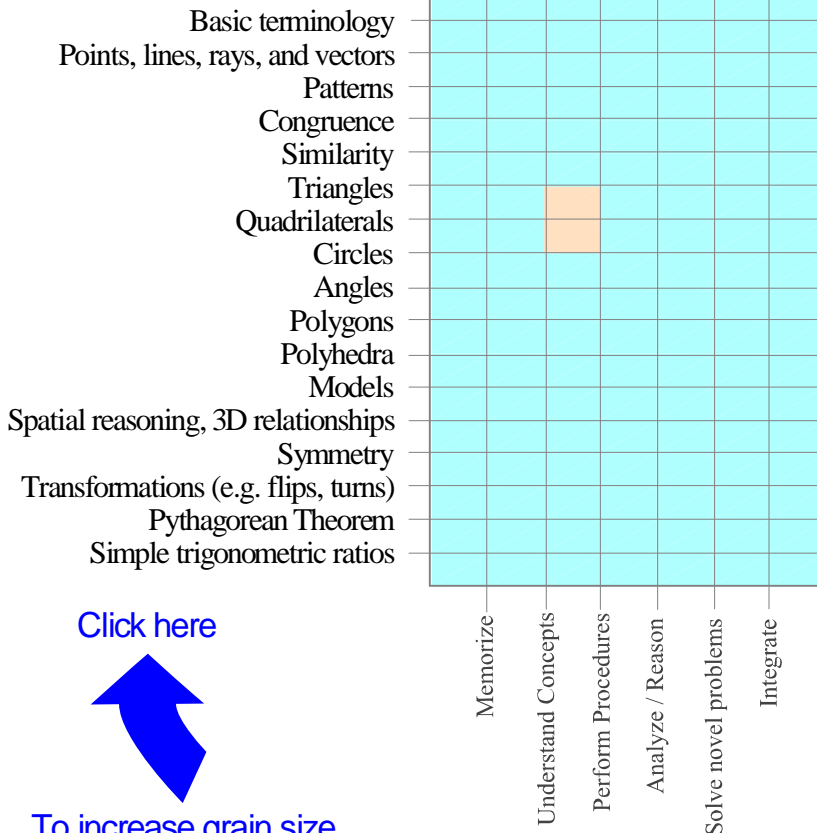
Grade 8 Mathematics Geometric Concepts Fine Grain Content Maps

Gr. 8 NAEP Assessment

Gr. 8 State Assessment



Teacher Reports (28)

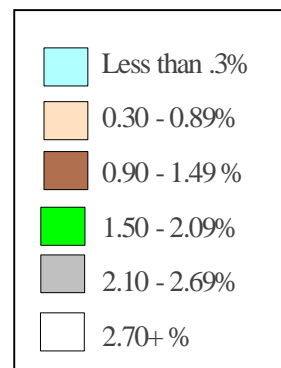


Alignment between Assessment & Teacher Reports of Practice:

Instr. To State Test **.14**

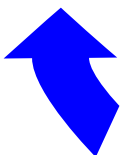
Instr. To NAEP Test **.39**

Percent of Instruction / Test



Measurement Interval = .01%

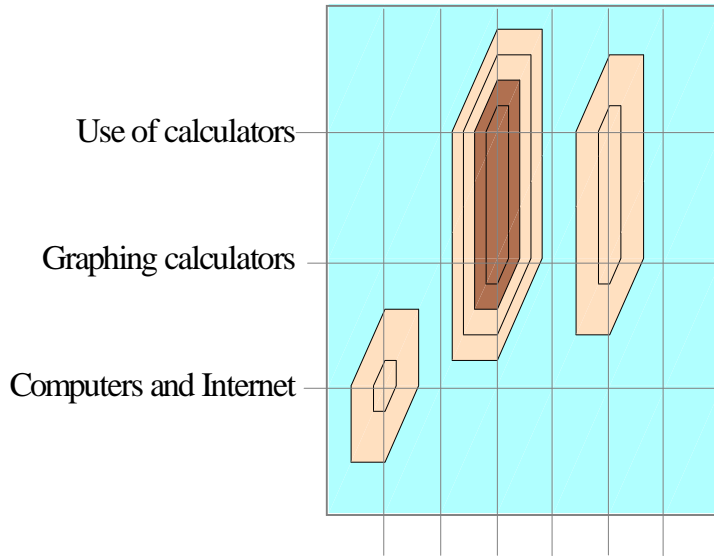
[Click here](#)



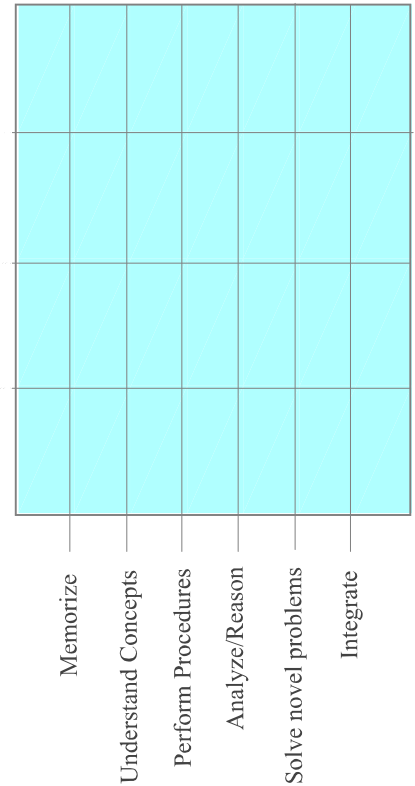
To increase grain size

Grade 8 Mathematics Instructional Technology Fine Grain Content Maps

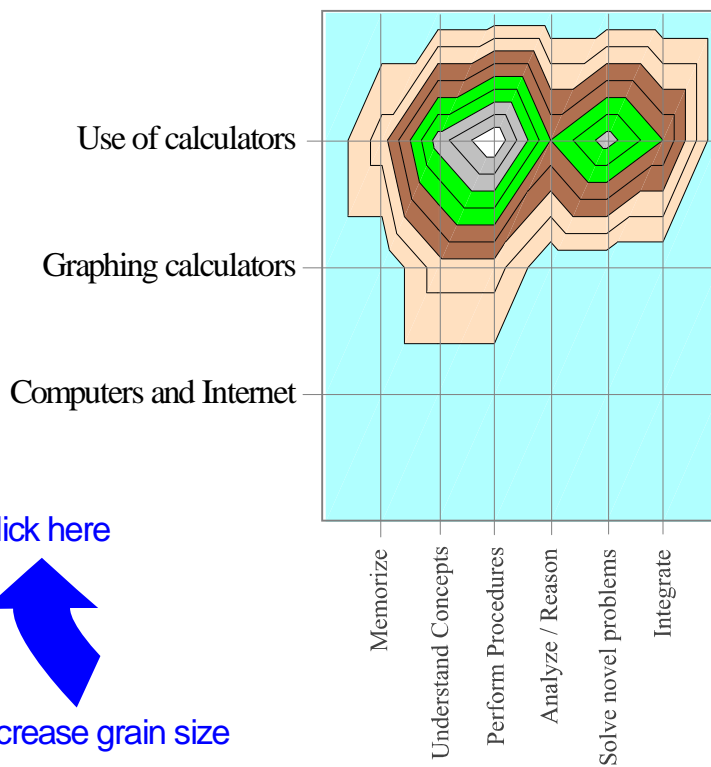
Gr. 8 NAEP Assessment



Gr. 8 State Assessment



Teacher Reports (28)

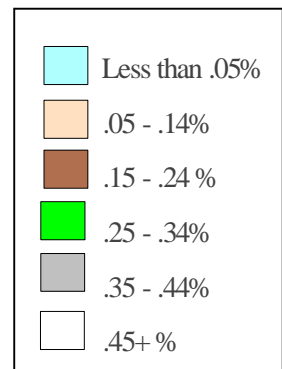


Alignment between Assessment & Teacher Reports of Practice:

Instr. To State Test **.00**

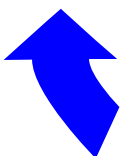
Instr. To NAEP Test **.44**

Percent of Instruction / Test



Measurement Interval = 0.01%

[Click here](#)



To increase grain size