

Content Maps and Measures of Alignment for Elementary Science

The charts on the following pages present ‘pictures’ or descriptions of instructional and assessment content for grade 4 science. 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 nutrition. However, this information alone only tells us so much about the item or lesson itself. Is the lesson primarily concerned with providing students an opportunity to learn the names and chief characteristics of certain vitamins and minerals important to good health? Or does the lesson (or test item) require students to formulate some hypothesis, conduct a laboratory investigation, or make some calculation? The cognitive demand dimension offers six categories into which any of the sixty-five topics listed for elementary science can be further distinguished. Thus elementary science is described using a two dimensional matrix consisting of sixty-five rows (topics) by six columns (cognitive demand), yielding a total matrix consisting of 390 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.

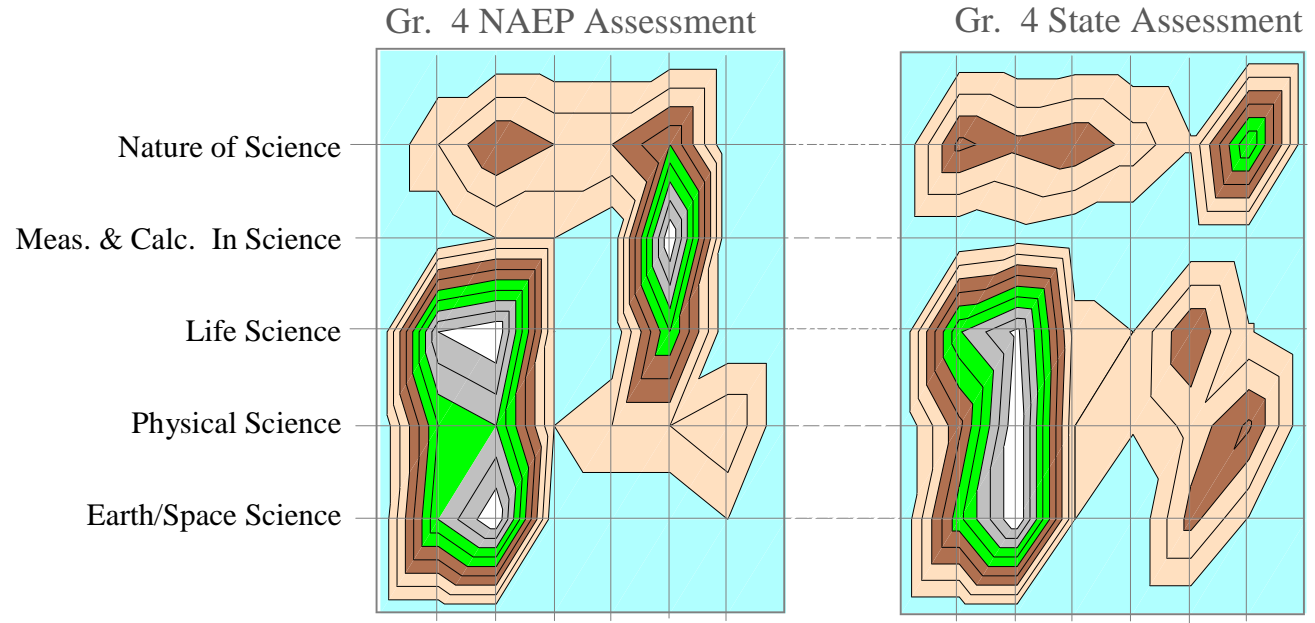
Topics are organized into three levels of grain size for elementary science. The 390 cells described above represent the finest grain level of description, and is the level at which the data is collected. For ease of reporting, this fine grain data can be aggregated up to medium and large grain ‘chunks’. The sixty-five unique topics are grouped into 15 ‘topic areas’, with each topic area made up of from two to seven topics. These fifteen topic areas are themselves grouped into 5 large grain ‘topic domains’. These topic domains are Nature of Science, Measurement & Calculation in Science, Life Science, Physical Science and Earth/Space Science.

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.

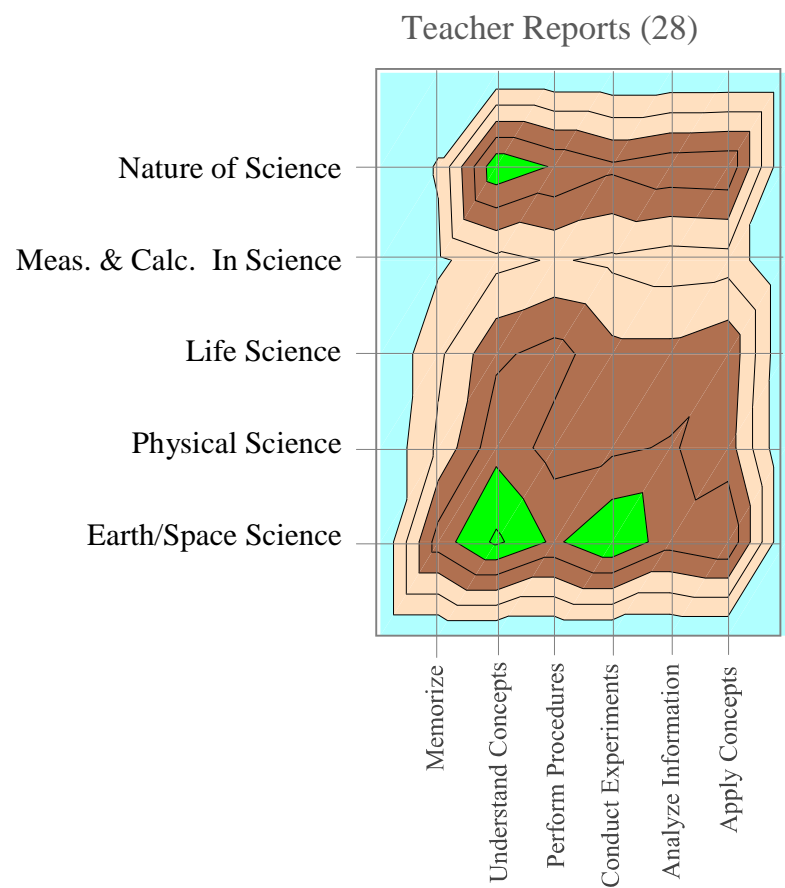
Alignment measures calculate the extent of agreement between two content embedded descriptions (generally instruction to assessment, though alignment can be measured between two assessment instruments or between two descriptions of practice). On the following pages, alignment measures are reported for 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 4 Science Large Grain Content Maps

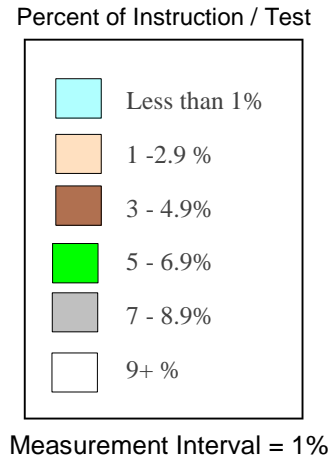
Click on topic area label or map area to see finer grain size.



Memorize
 Understand Concepts
 Perform Procedures
 Conduct Experiments
 Analyze Information
 Apply Concepts



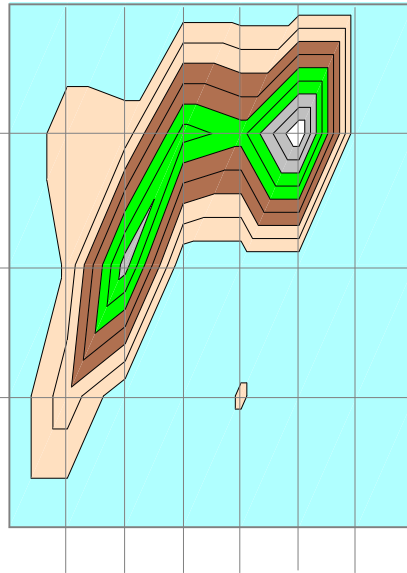
Alignment between Assessment
& Teacher Reports of Practice:
 Instr. To State Test **.35**
 Instr. To NAEP Test **.23**



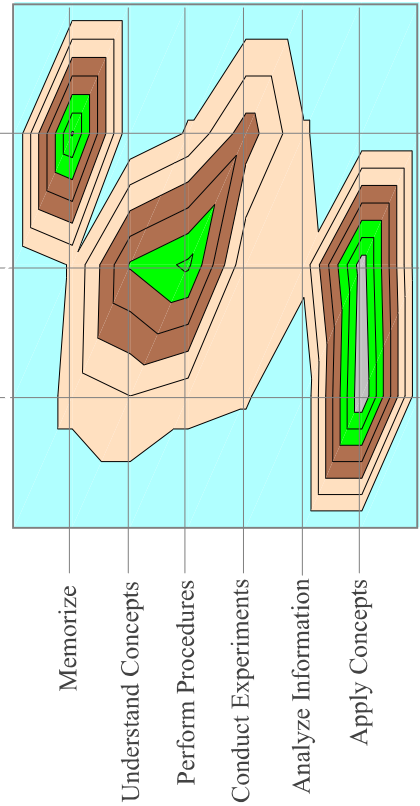
Grade 4 Science Nature of Science Medium Grain Content Maps

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

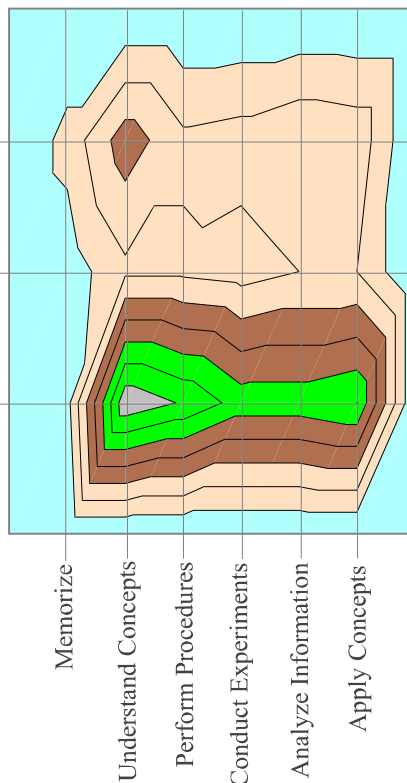
Gr. 4 NAEP Assessment



Gr. 4 State Assessment



Teacher Reports (28)

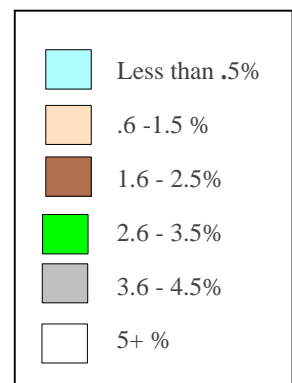


Alignment between Assessment
& Teacher Reports of Practice:

Instr. To State Test **.47**

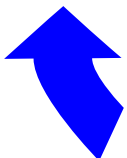
Instr. To NAEP Test **.29**

Percent of Instruction / Test



Measurement Interval = 1/2%

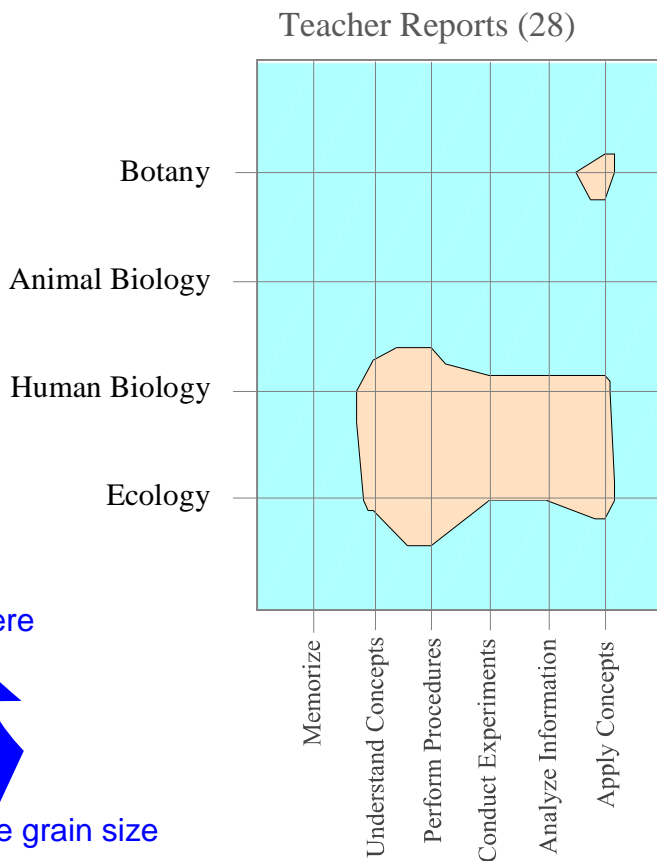
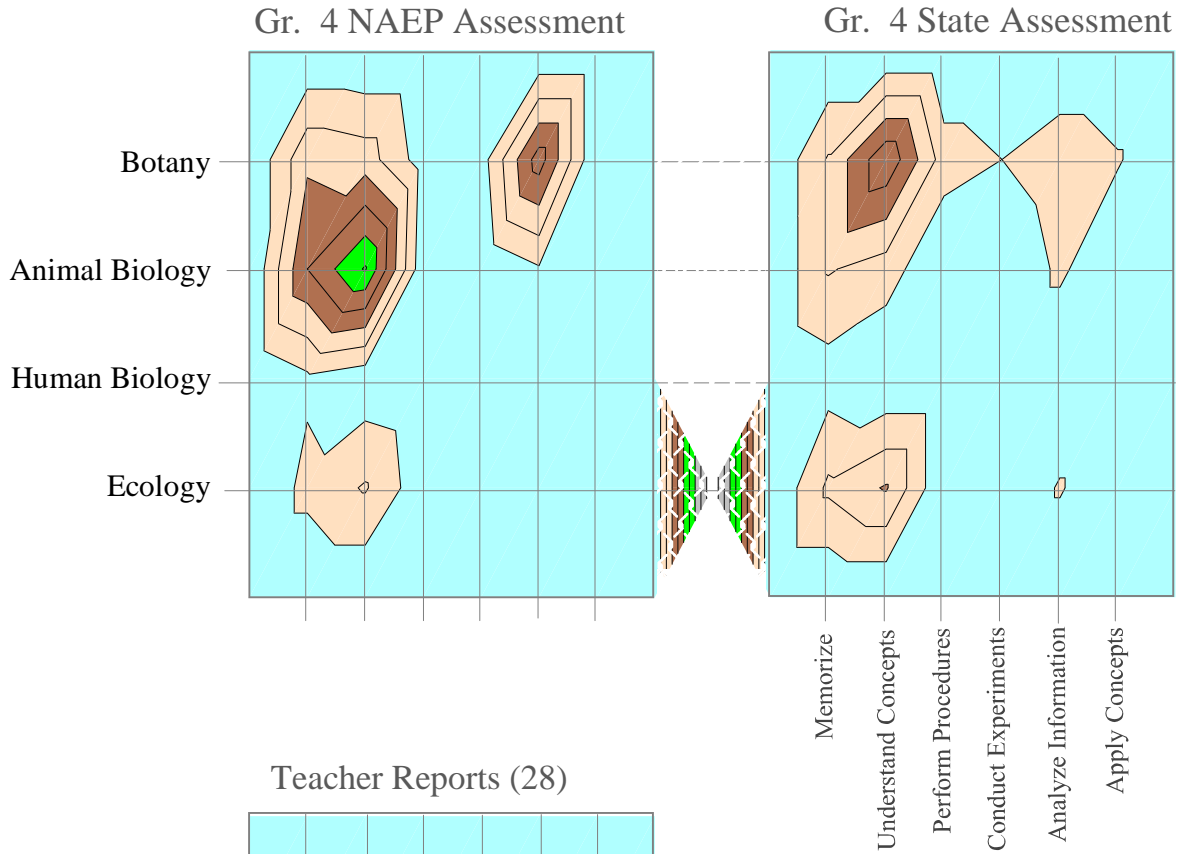
Click here



To increase grain size

Grade 4 Science Life Science Medium Grain Content Maps

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

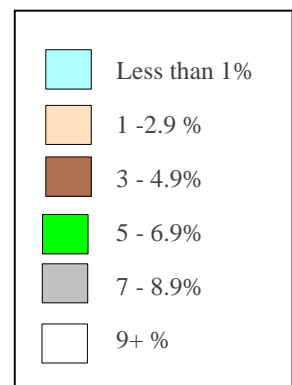


Alignment between Assessment & Teacher Reports of Practice:

Instr. To State Test **.44**

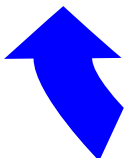
Instr. To NAEP Test **.38**

Percent of Instruction / Test



Measurement Interval = 1%

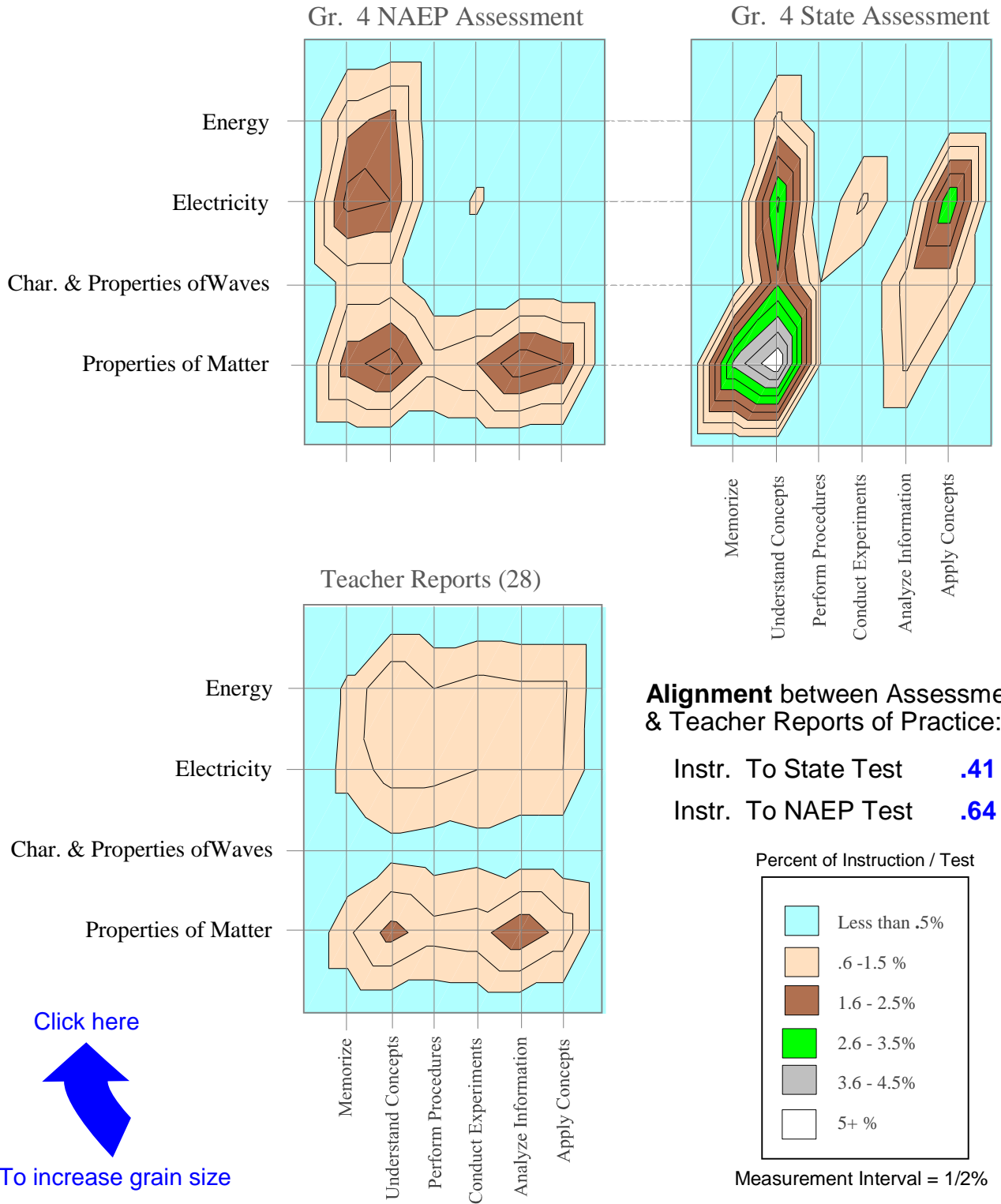
Click here



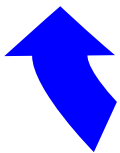
To increase grain size

Grade 4 Science Physical Science Medium Grain Content Maps

[Click on topic area label or map area to see finer grain size.](#)



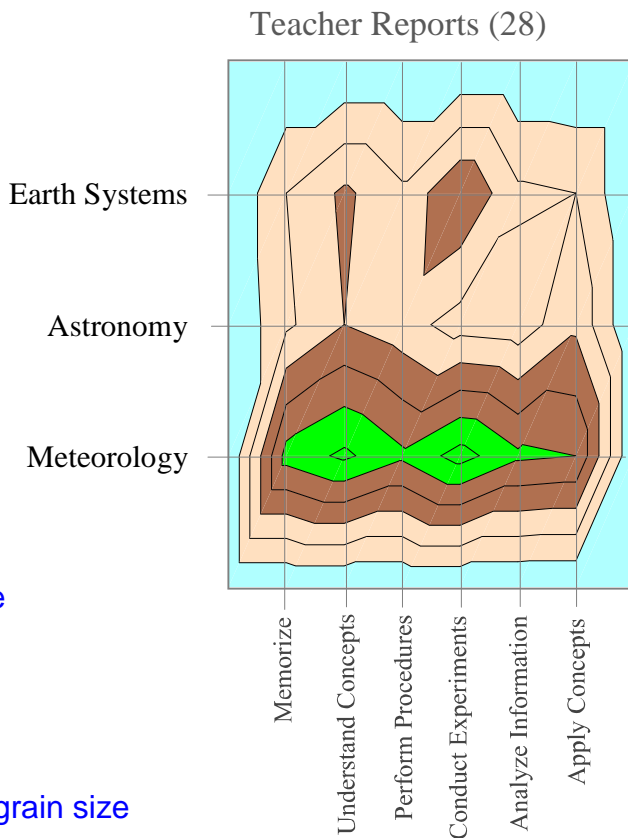
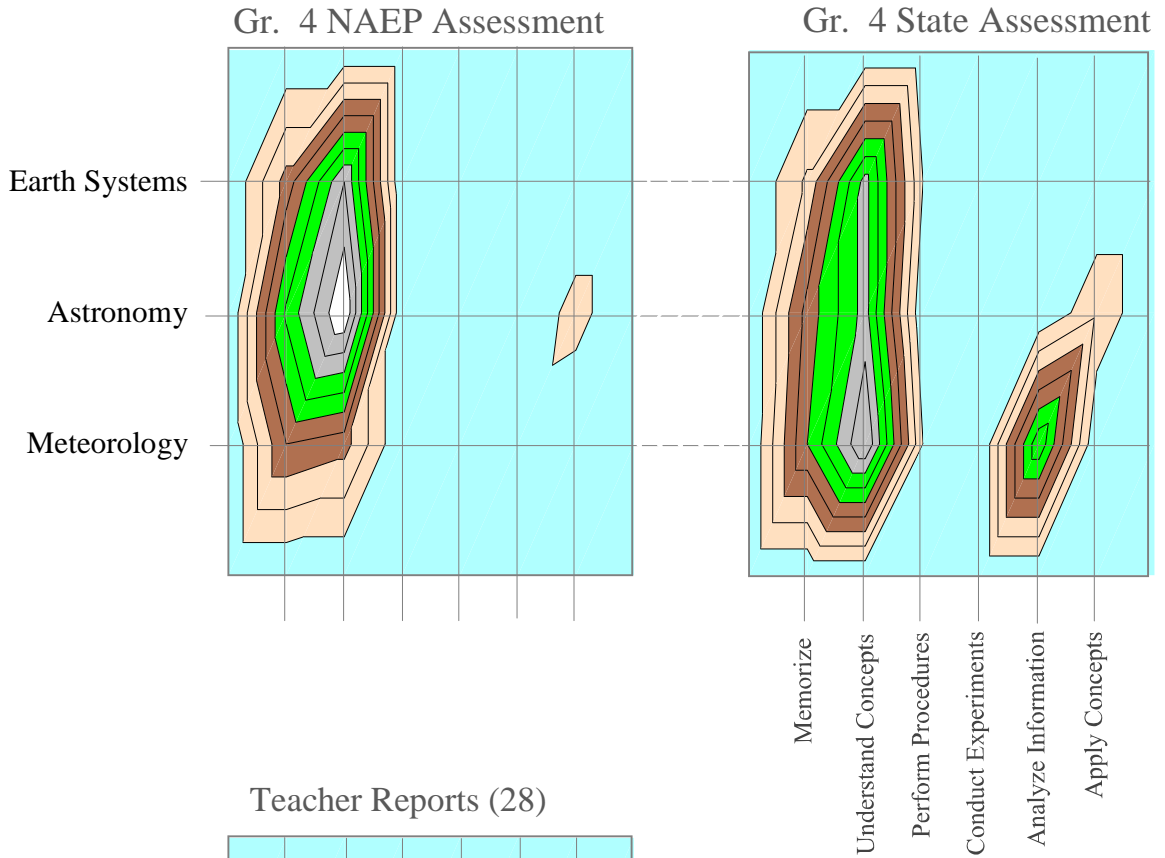
[Click here](#)



To increase grain size

Grade 4 Science Earth/Space Science Medium Grain Content Maps

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

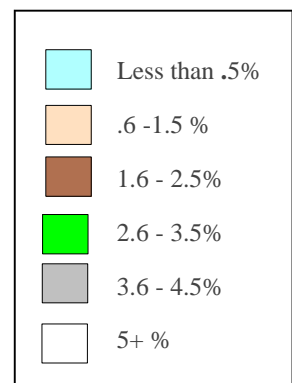


Alignment between Assessment & Teacher Reports of Practice:

Instr. To State Test **.51**

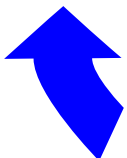
Instr. To NAEP Test **.38**

Percent of Instruction / Test



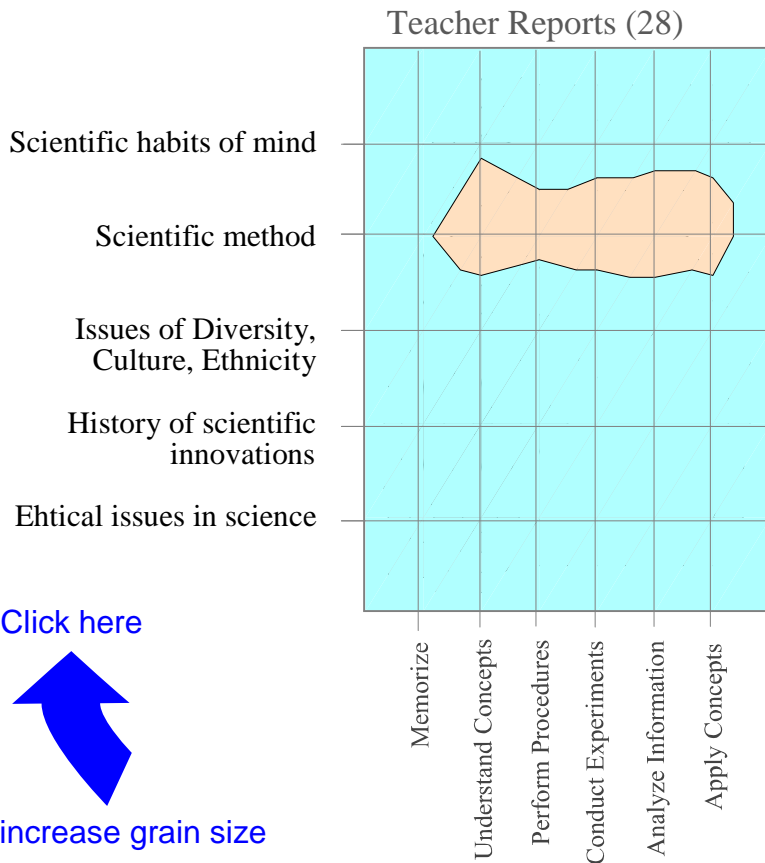
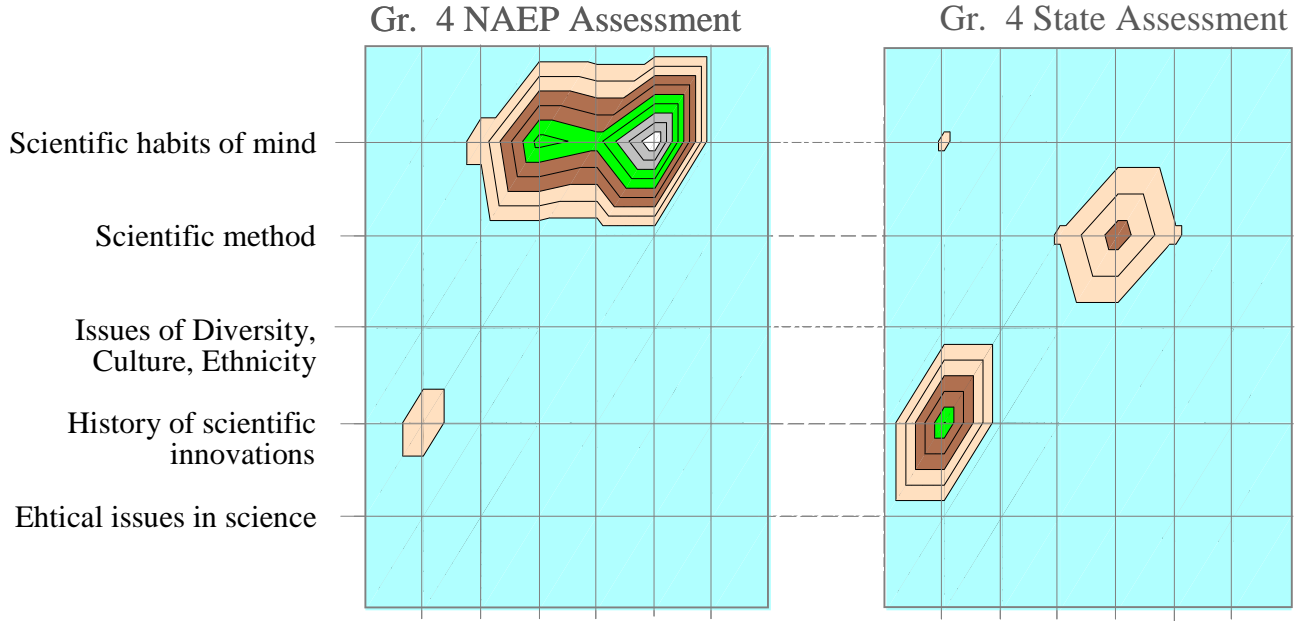
Measurement Interval = 1/2%

Click here



To increase grain size

Grade 4 Science Nature of Science Fine Grain Content Maps

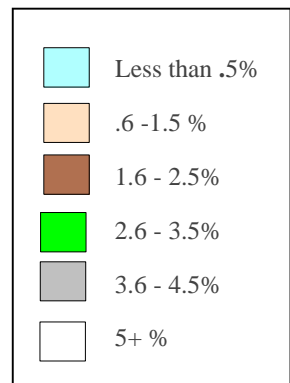


Alignment between Assessment & Teacher Reports of Practice:

Instr. To State Test **.31**

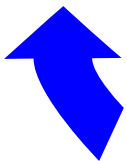
Instr. To NAEP Test **.19**

Percent of Instruction / Test



Measurement Interval = 1/2%

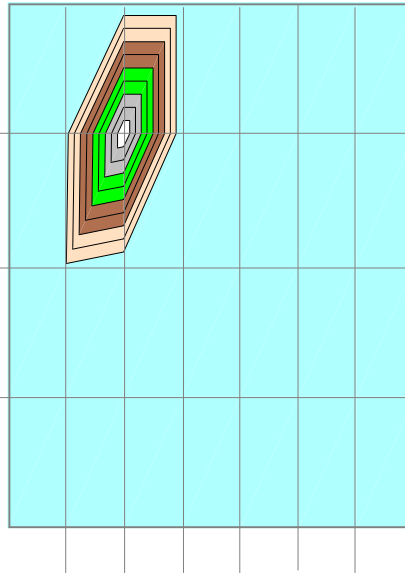
[Click here](#)



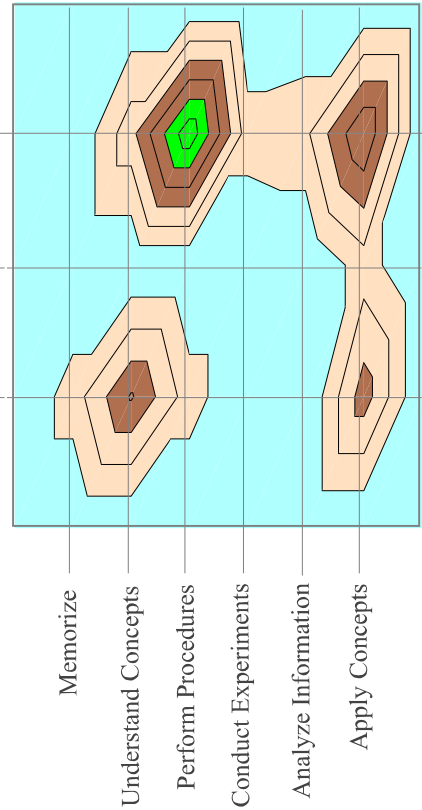
To increase grain size

Grade 4 Science Science & Technology Fine Grain Content Maps

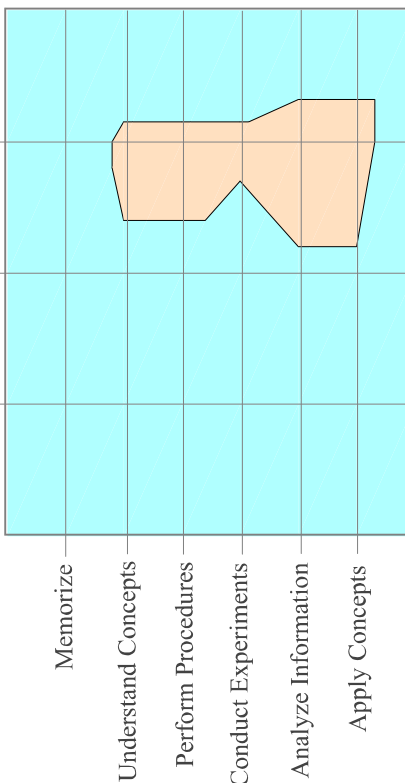
Gr. 4 NAEP Assessment



Gr. 4 State Assessment



Teacher Reports (28)

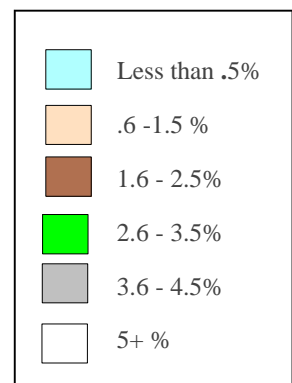


Alignment between Assessment & Teacher Reports of Practice:

Instr. To State Test **.53**

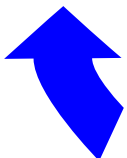
Instr. To NAEP Test **.14**

Percent of Instruction / Test



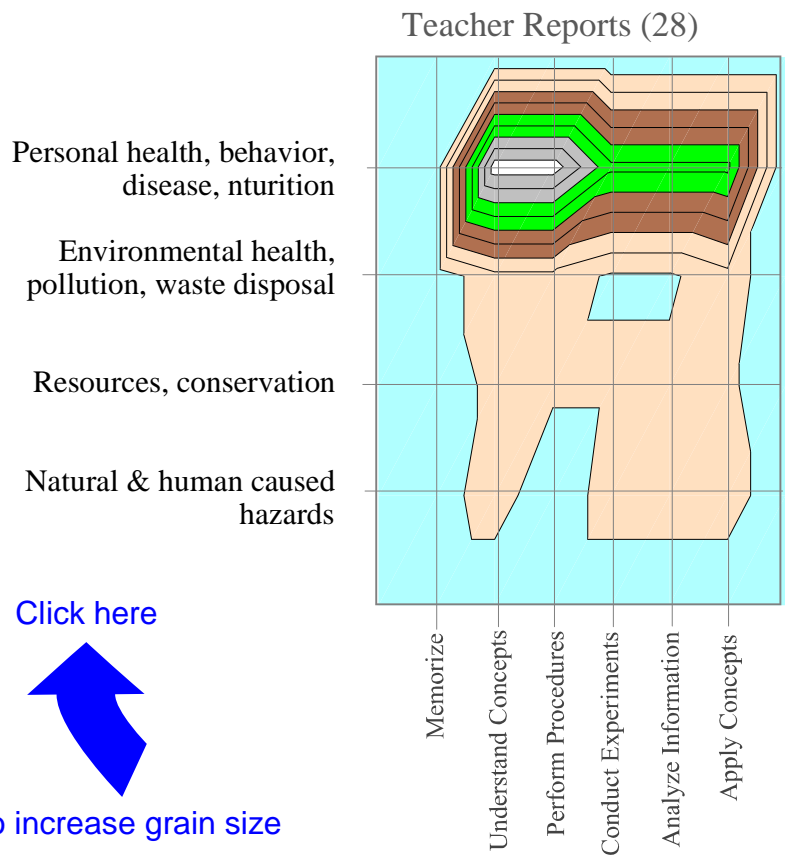
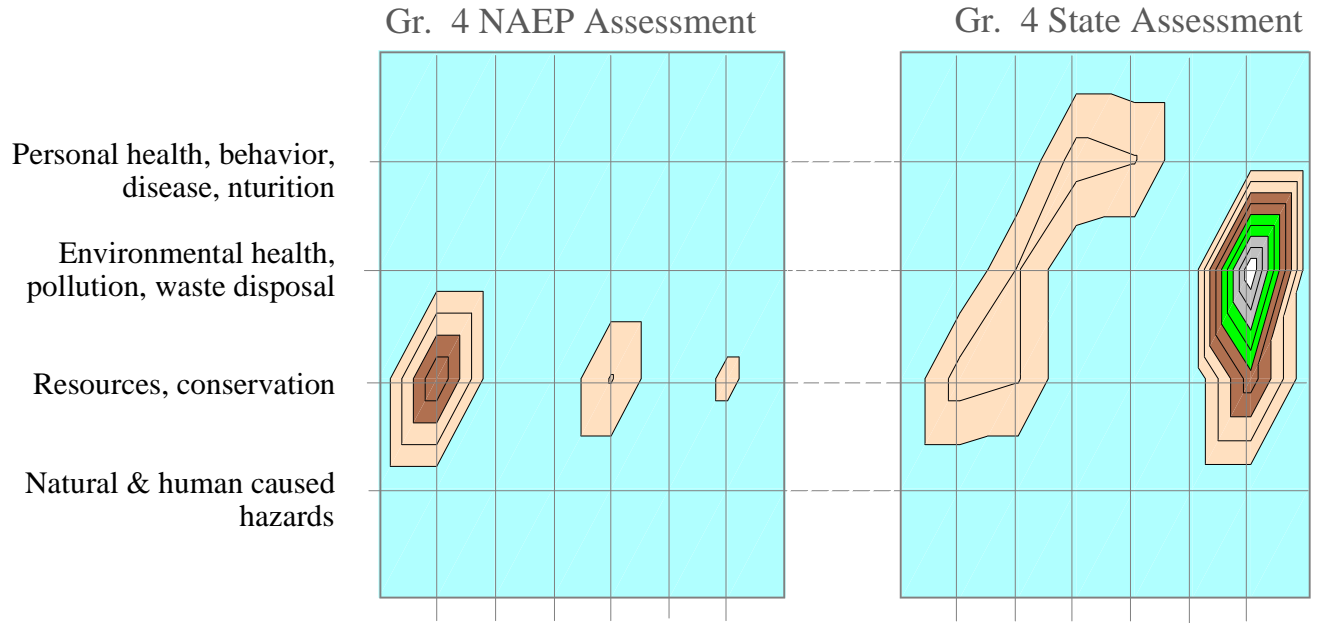
Measurement Interval = 1/2%

[Click here](#)



To increase grain size

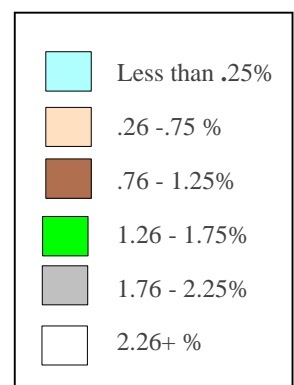
Grade 4 Science Science, Health & Environment Fine Grain Content Maps



Alignment between Assessment & Teacher Reports of Practice:

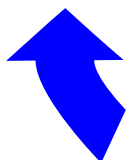
Instr. To State Test **.28**
 Instr. To NAEP Test **.05**

Percent of Instruction / Test



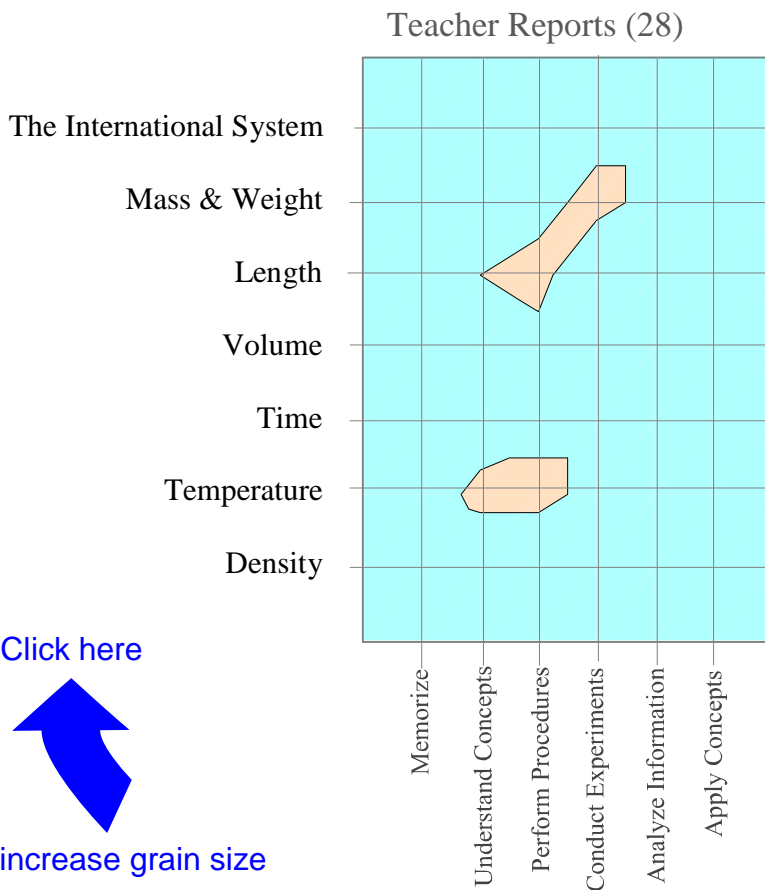
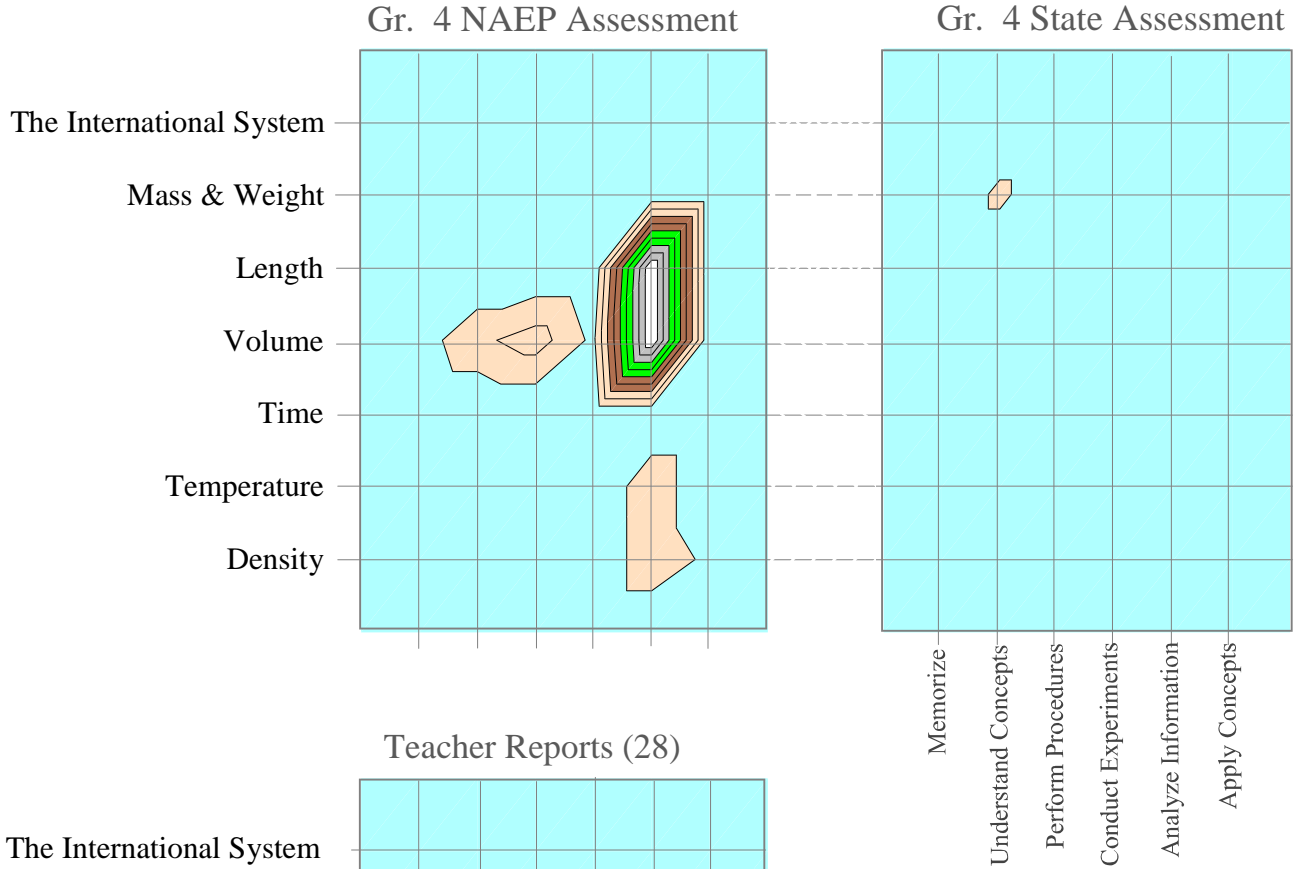
Measurement Interval = 1/4%

[Click here](#)



To increase grain size

Grade 4 Science Measurement & Calculation in Science Fine Grain Content Maps

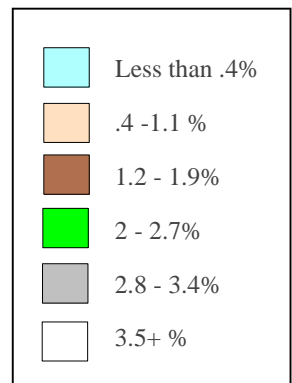


Alignment between Assessment & Teacher Reports of Practice:

Instr. To State Test **.02**

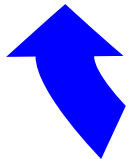
Instr. To NAEP Test **.18**

Percent of Instruction / Test



Measurement Interval = .4%

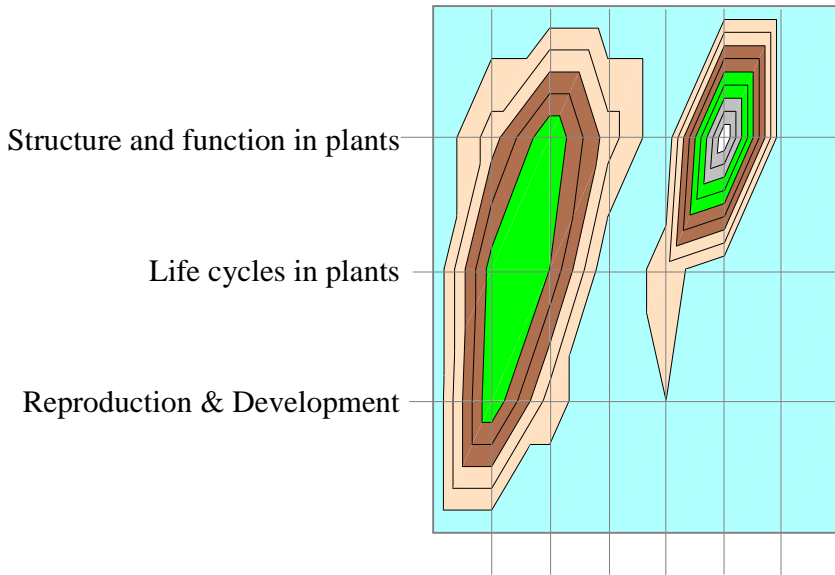
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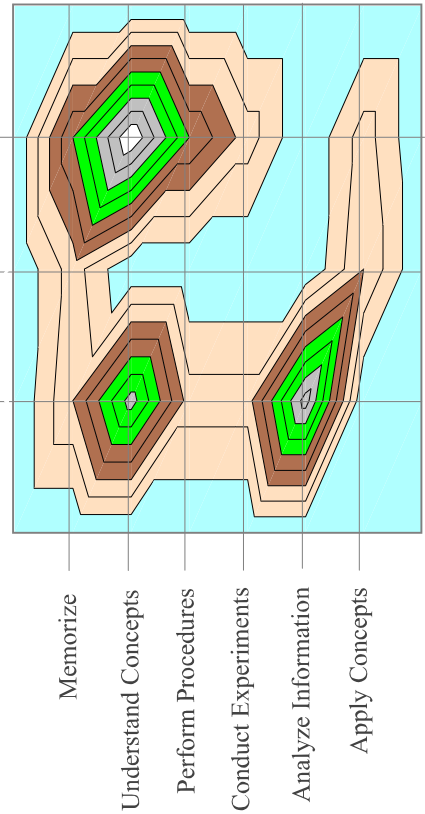
To increase grain size

Grade 4 Science Botany Fine Grain Content Maps

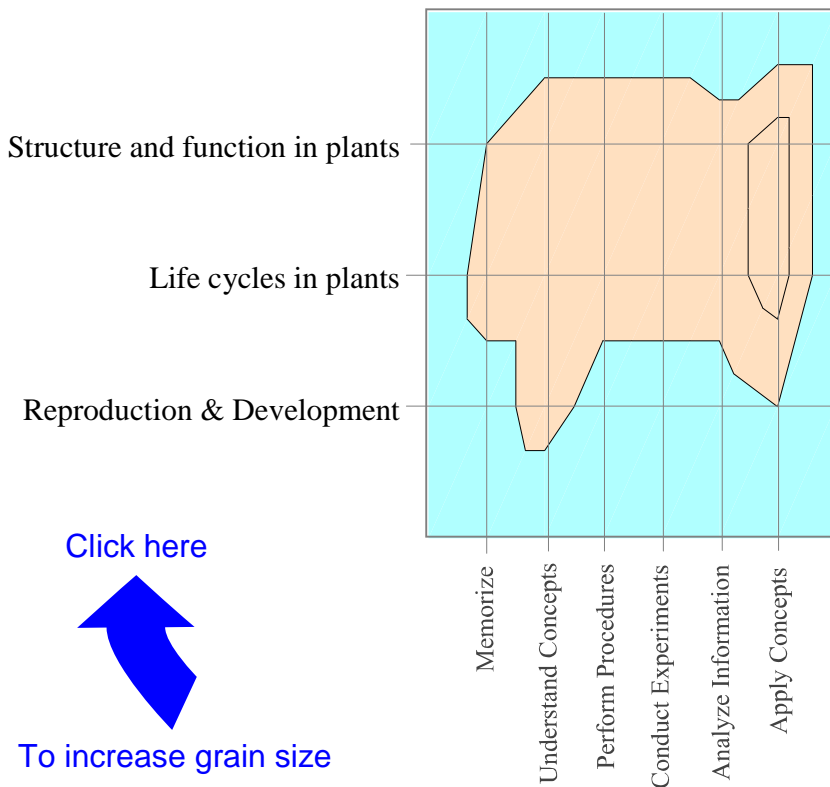
Gr. 4 NAEP Assessment



Gr. 4 State Assessment



Teacher Reports (28)

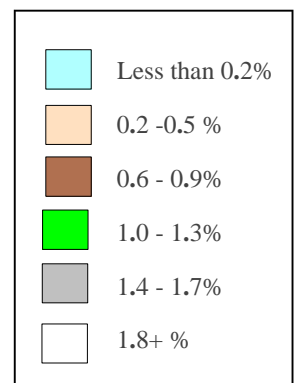


Alignment between Assessment & Teacher Reports of Practice:

Instr. To State Test **.51**

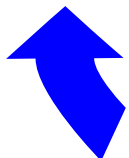
Instr. To NAEP Test **.43**

Percent of Instruction / Test



Measurement Interval = 0.2%

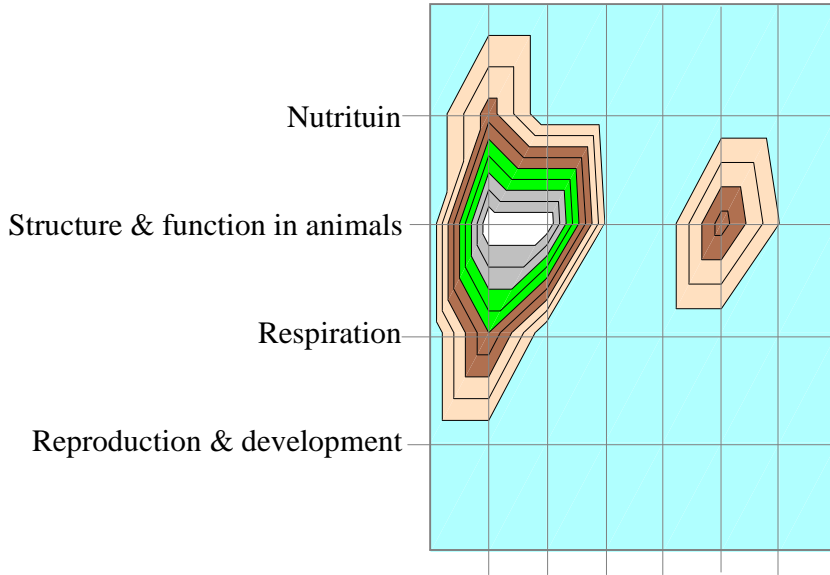
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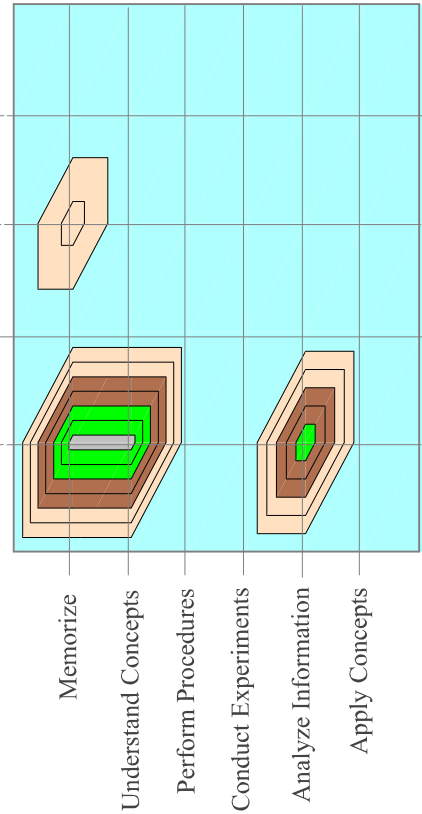
To increase grain size

Grade 4 Science Animal Biology Fine Grain Content Maps

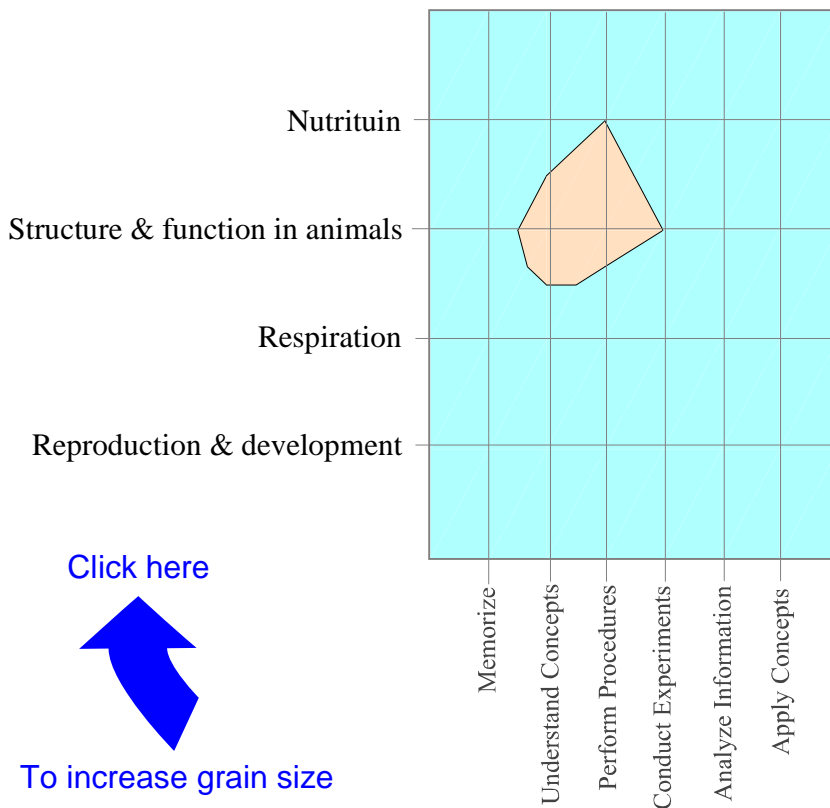
Gr. 4 NAEP Assessment



Gr. 4 State Assessment



Teacher Reports (28)

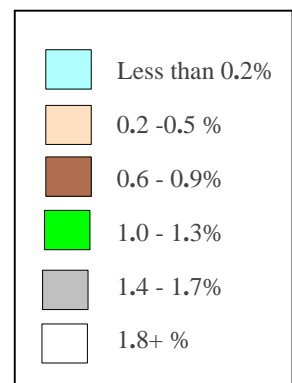


Alignment between Assessment & Teacher Reports of Practice:

Instr. To State Test **.05**

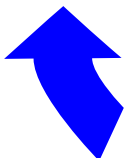
Instr. To NAEP Test **.31**

Percent of Instruction / Test



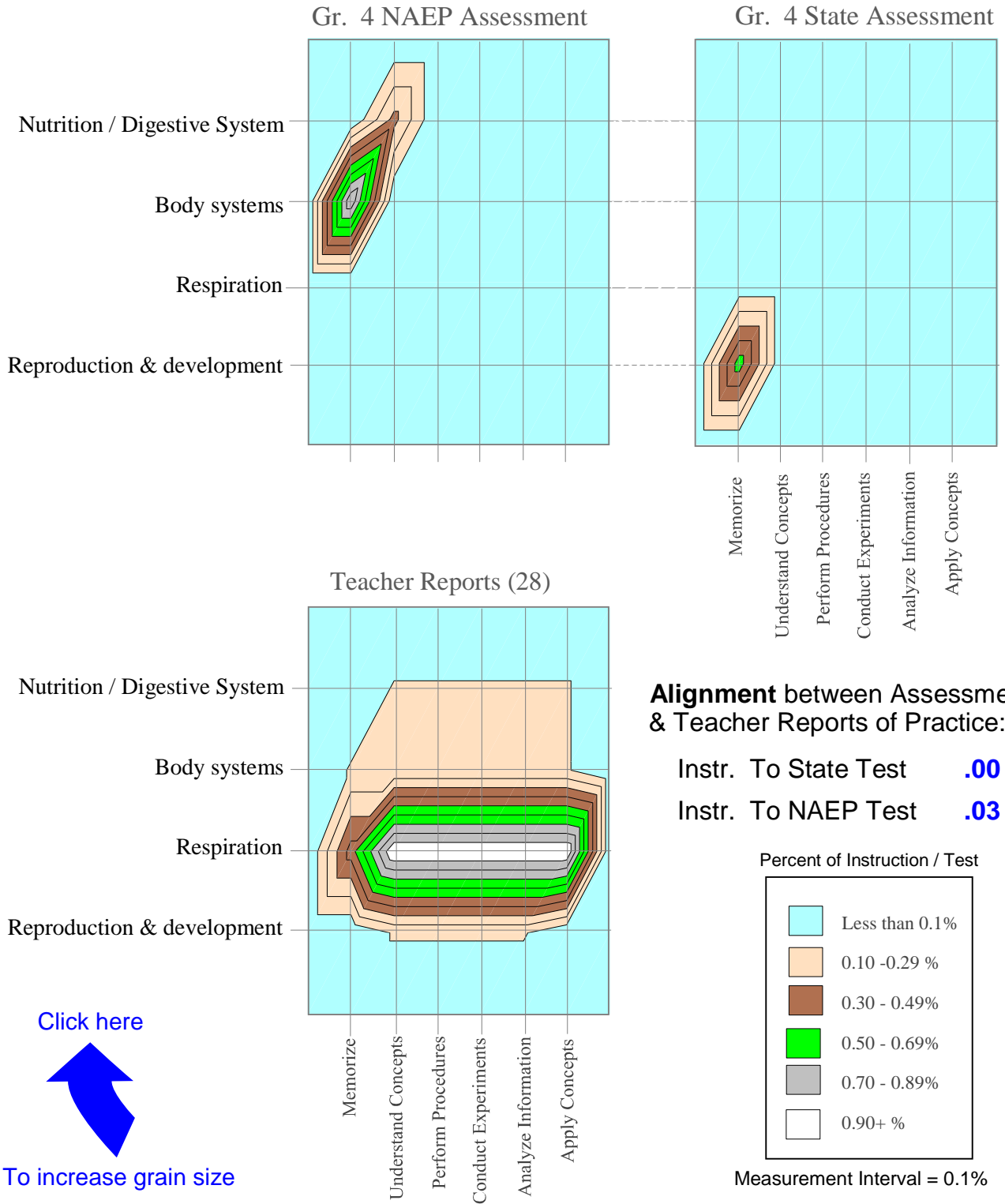
Measurement Interval = 0.2%

[Click here](#)

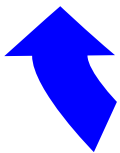


To increase grain size

Grade 4 Science Human Biology Fine Grain Content Maps



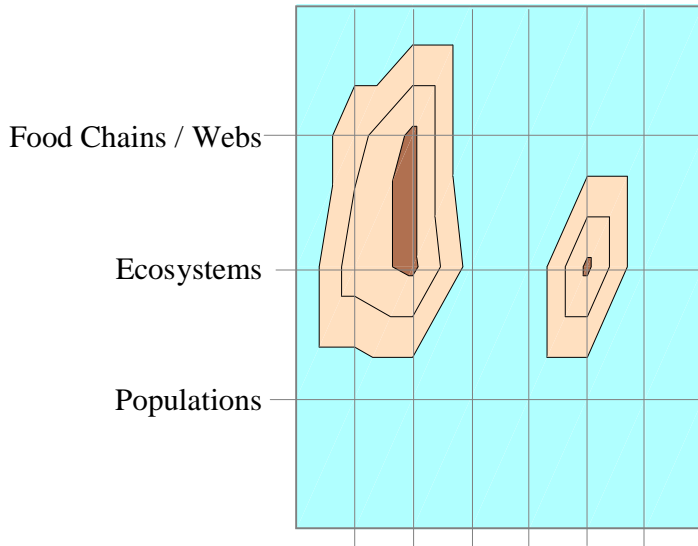
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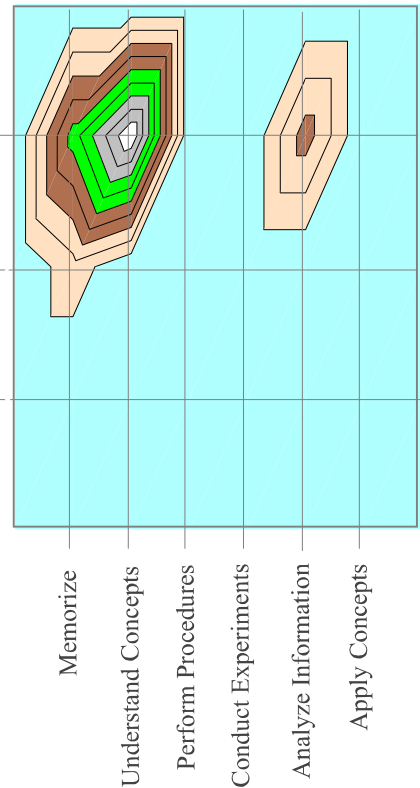
To increase grain size

Grade 4 Science Ecology Fine Grain Content Maps

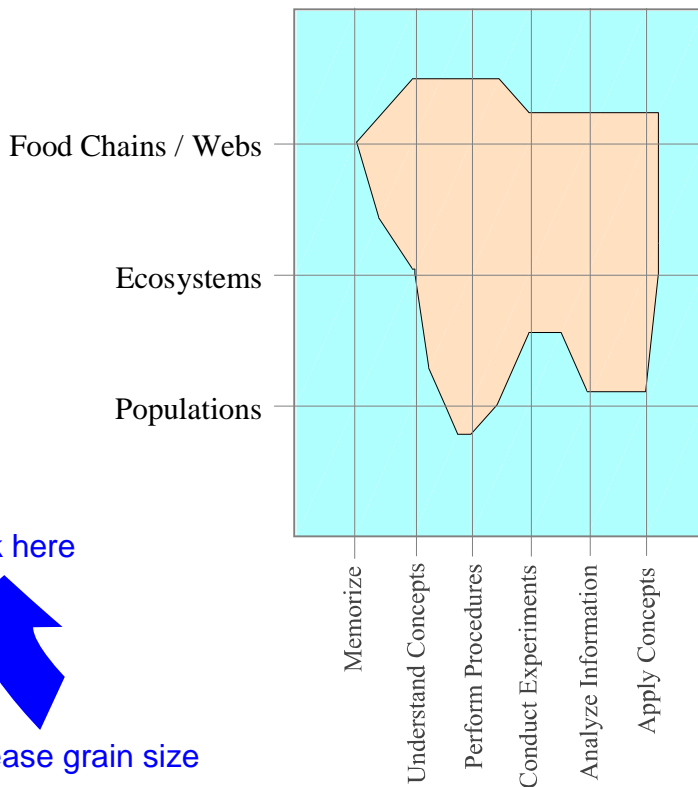
Gr. 4 NAEP Assessment



Gr. 4 State Assessment



Teacher Reports (28)

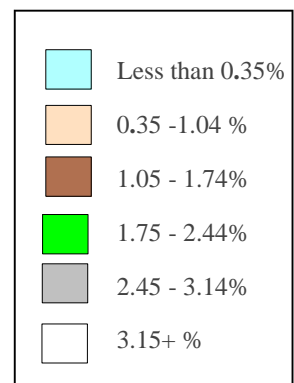


Alignment between Assessment & Teacher Reports of Practice:

Instr. To State Test **.22**

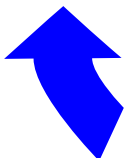
Instr. To NAEP Test **.35**

Percent of Instruction / Test



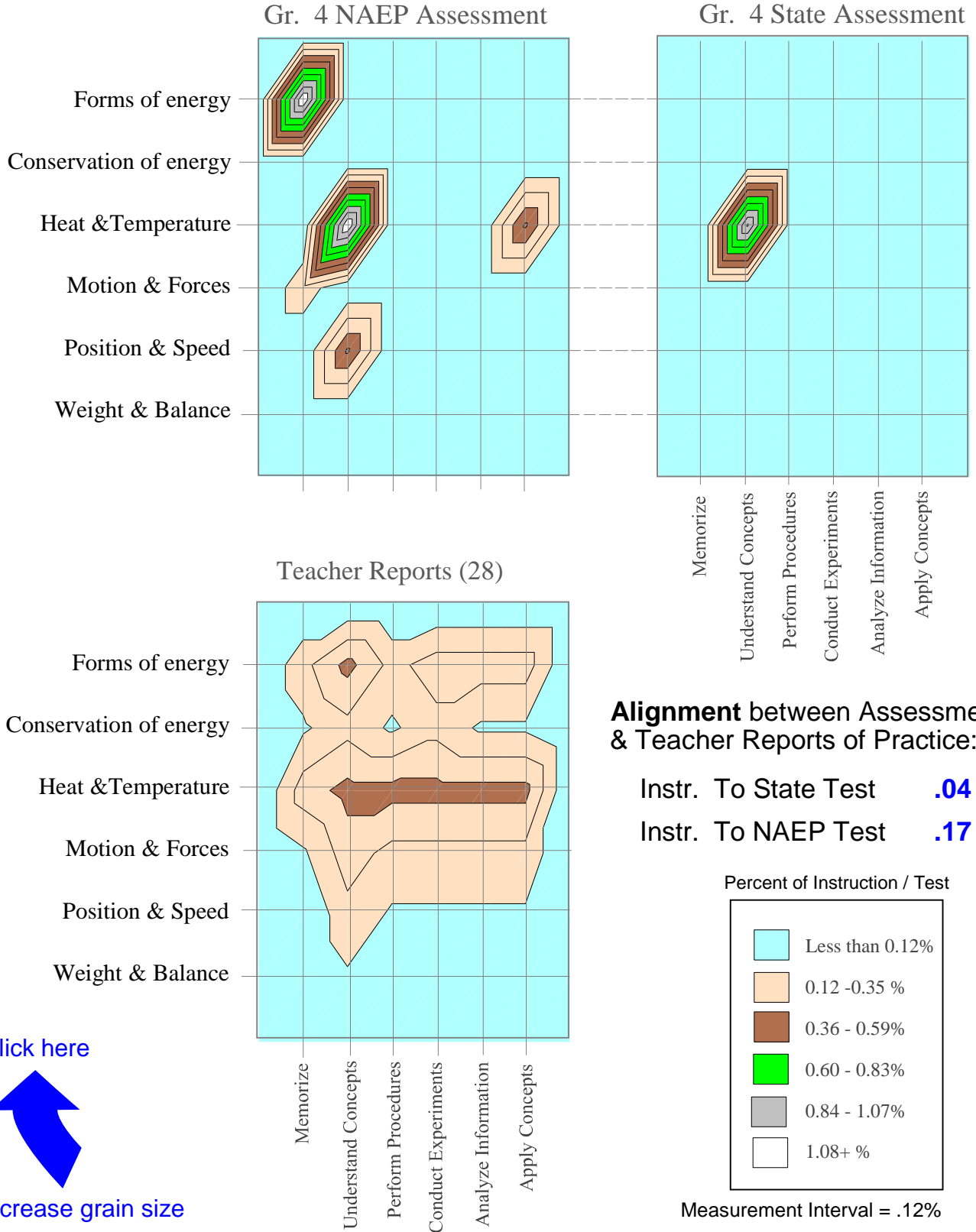
Measurement Interval = 0.35%

Click here

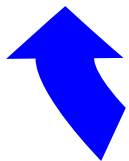


To increase grain size

Grade 4 Science Energy Fine Grain Content Maps

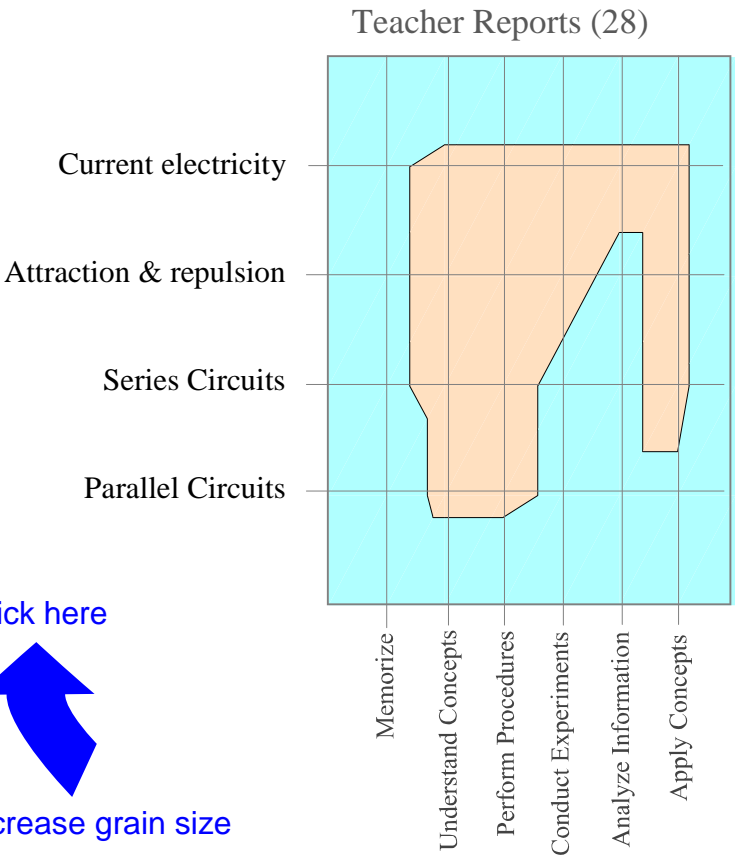
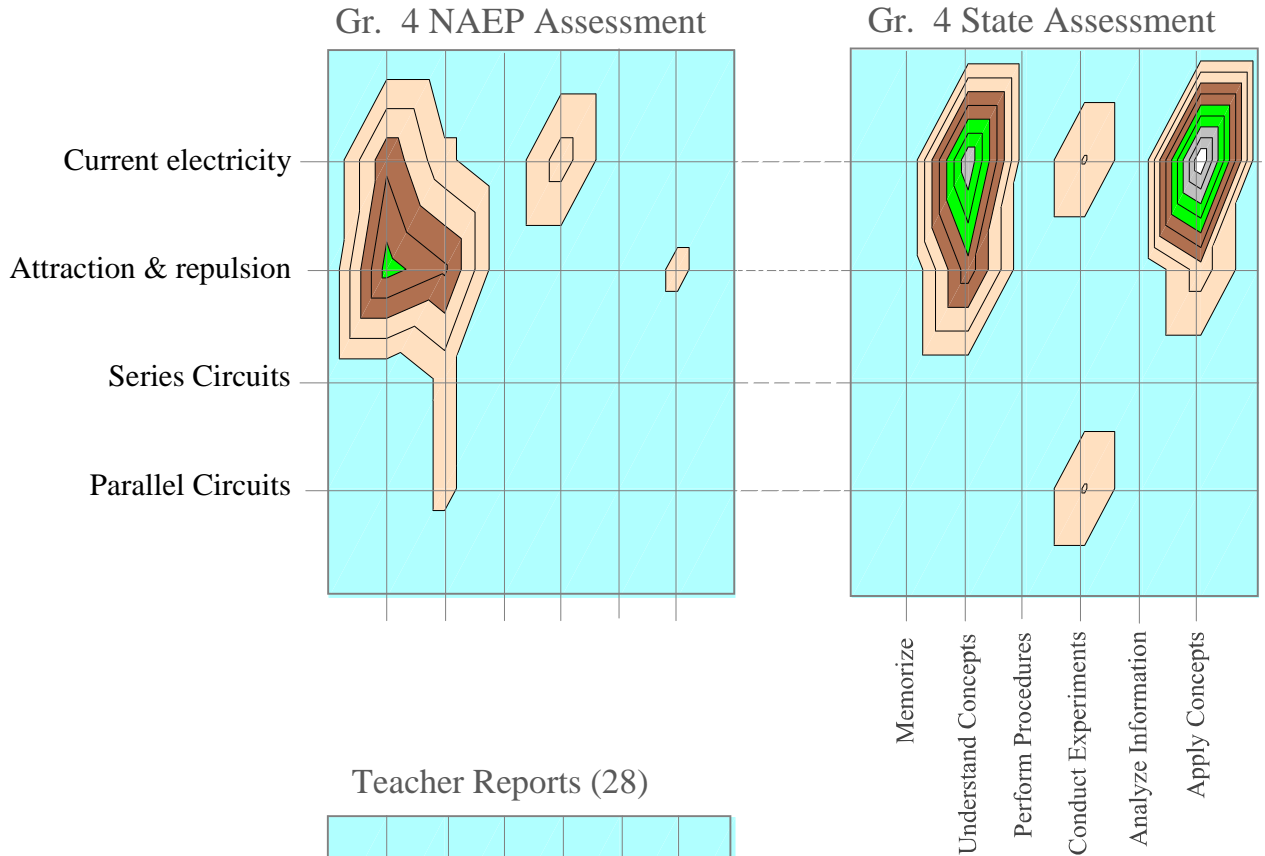


[Click here](#)



To increase grain size

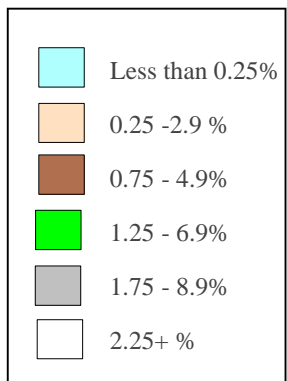
Grade 4 Science Electricity Fine Grain Content Maps



Alignment between Assessment & Teacher Reports of Practice:

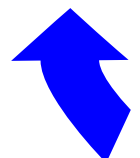
Instr. To State Test **.28**
 Instr. To NAEP Test **.36**

Percent of Instruction / Test



Measurement Interval = .25%

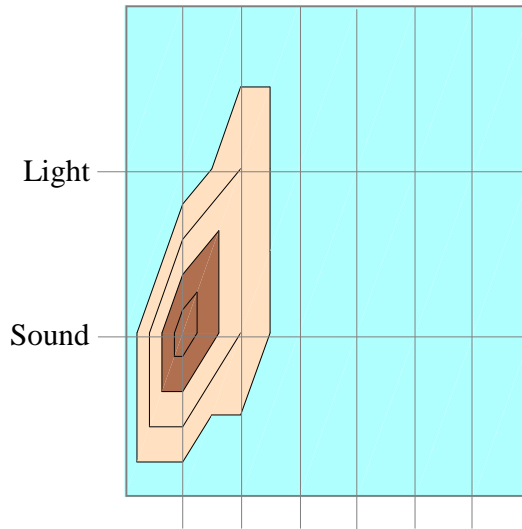
[Click here](#)



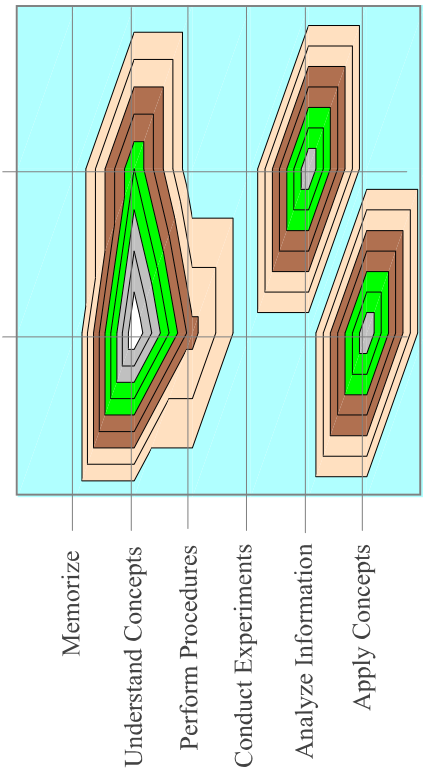
To increase grain size

Grade 4 Science Characteristics & Behavior of Waves Fine Grain Content Maps

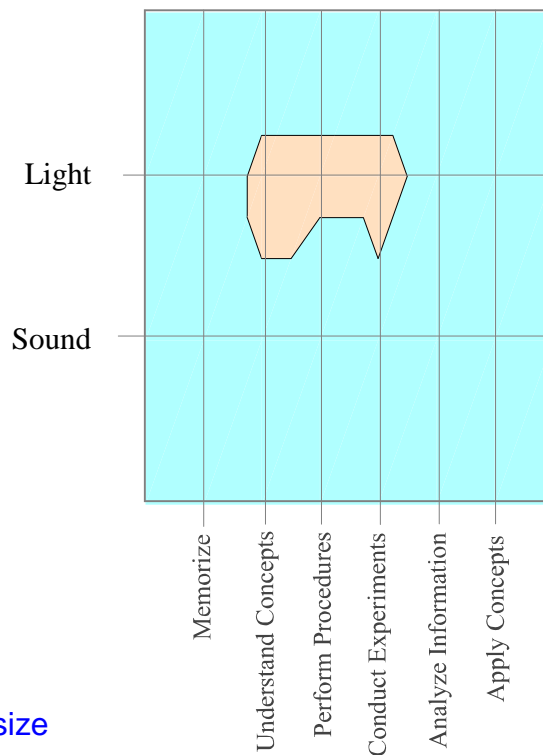
Gr. 4 NAEP Assessment



Gr. 4 State Assessment



Teacher Reports (28)

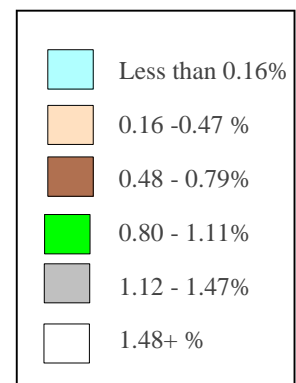


Alignment between Assessment
& Teacher Reports of Practice:

Instr. To State Test **.39**

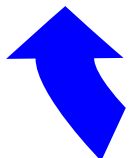
Instr. To NAEP Test **.33**

Percent of Instruction / Test



Measurement Interval = .16%

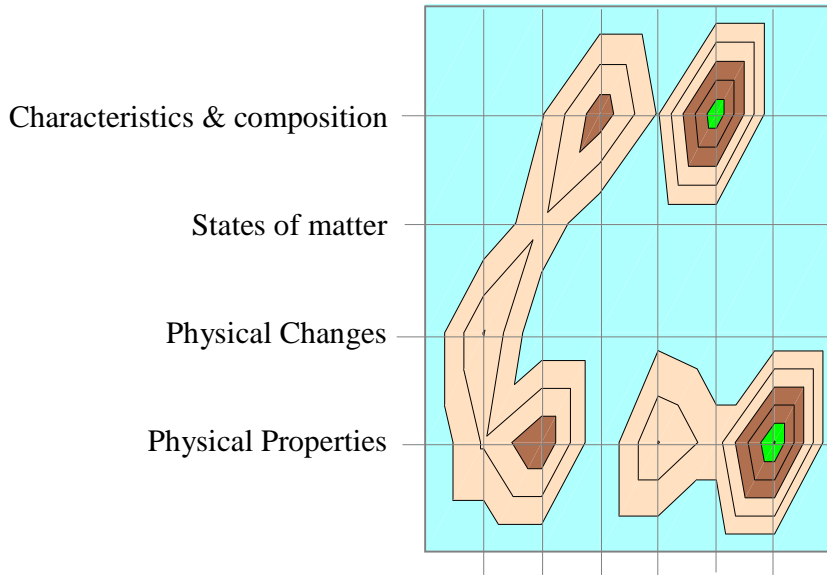
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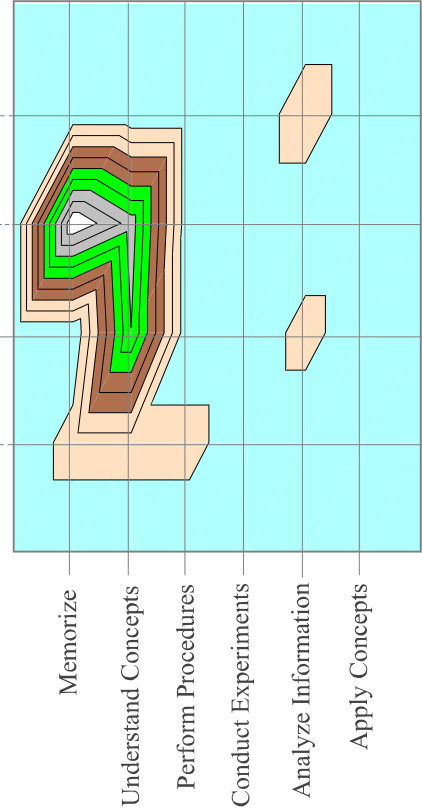
To increase grain size

Grade 4 Science Properties of Matter Fine Grain Content Maps

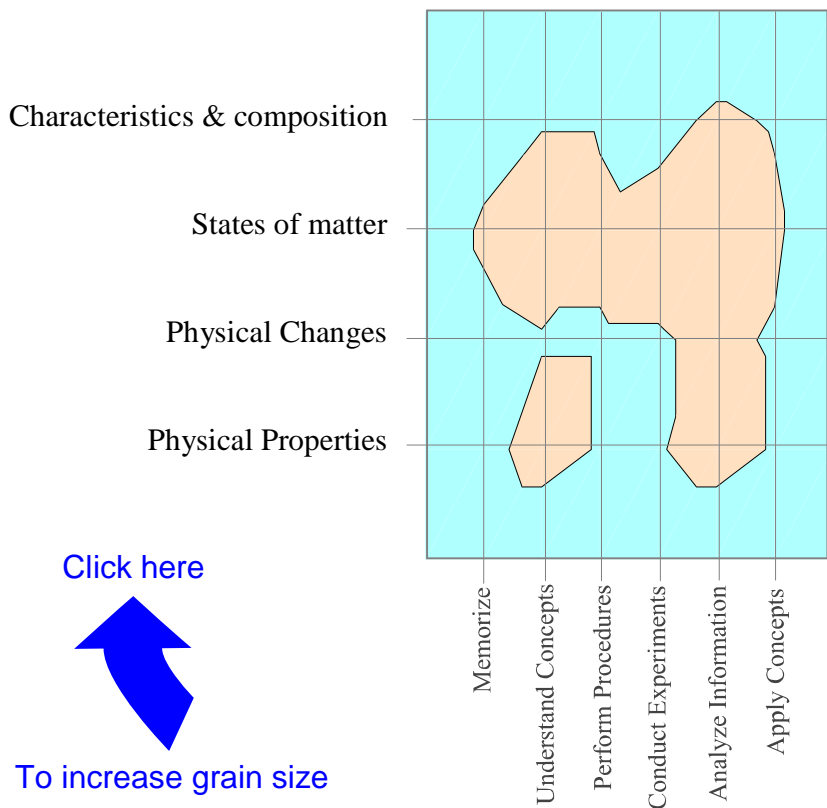
Gr. 4 NAEP Assessment



Gr. 4 State Assessment



Teacher Reports (28)

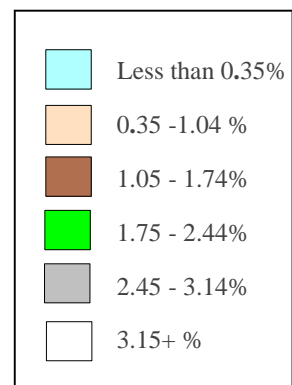


Alignment between Assessment & Teacher Reports of Practice:

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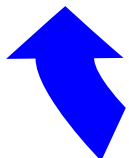
Instr. To NAEP Test **.44**

Percent of Instruction / Test



Measurement Interval = 0.35%

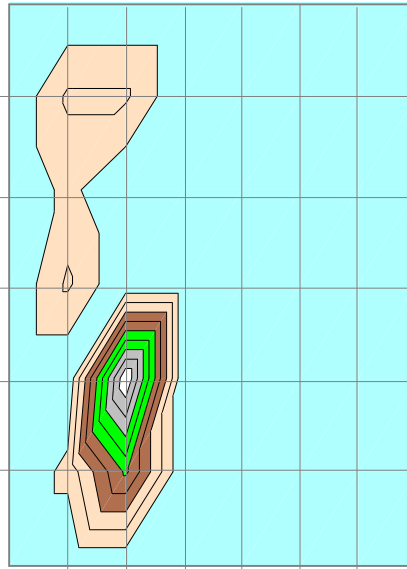
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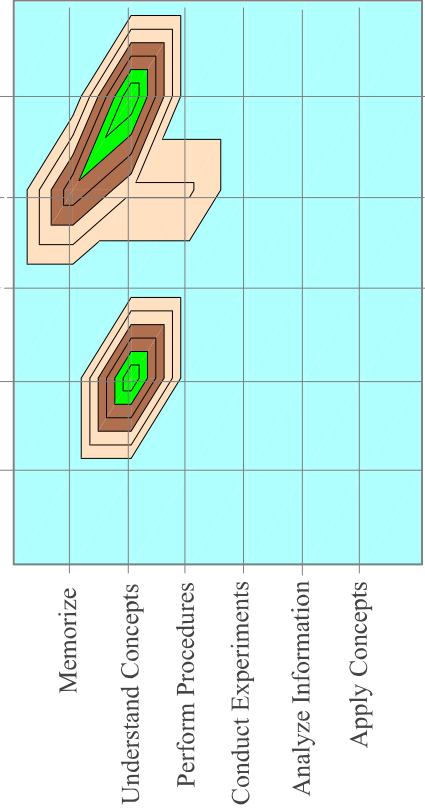
To increase grain size

Grade 4 Science Earth Systems Fine Grain Content Maps

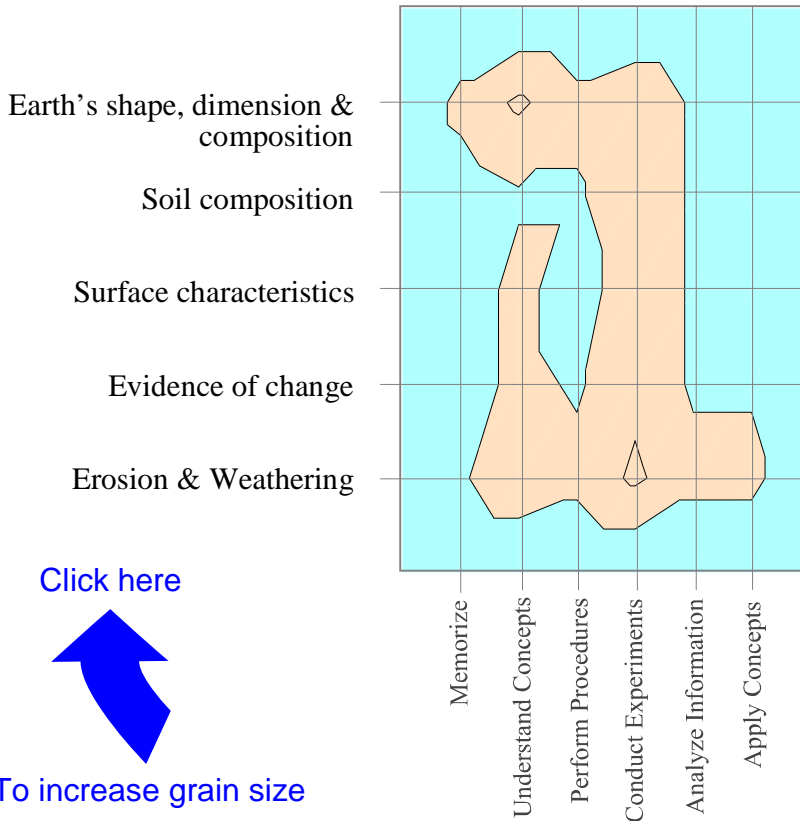
Gr. 4 NAEP Assessment



Gr. 4 State Assessment



Teacher Reports (28)

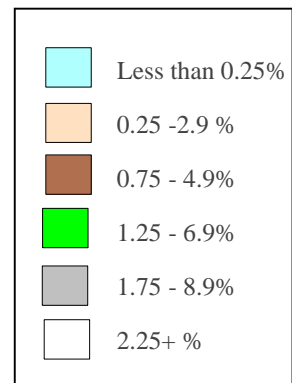


Alignment between Assessment & Teacher Reports of Practice:

Instr. To State Test **.17**

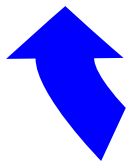
Instr. To NAEP Test **.24**

Percent of Instruction / Test



Measurement Interval = .25%

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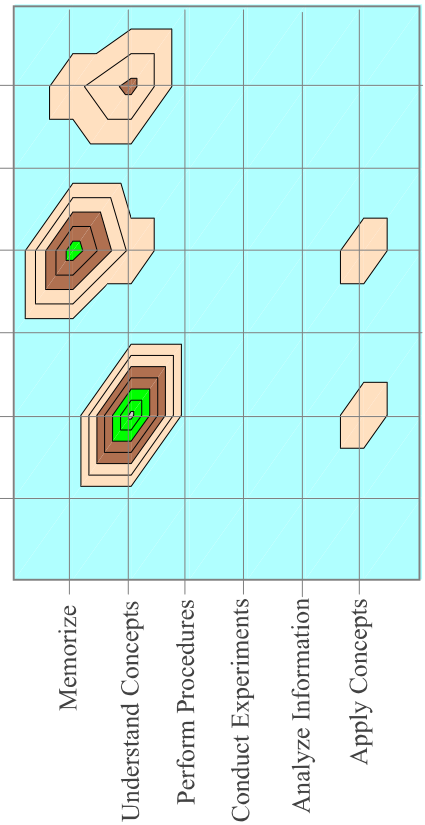
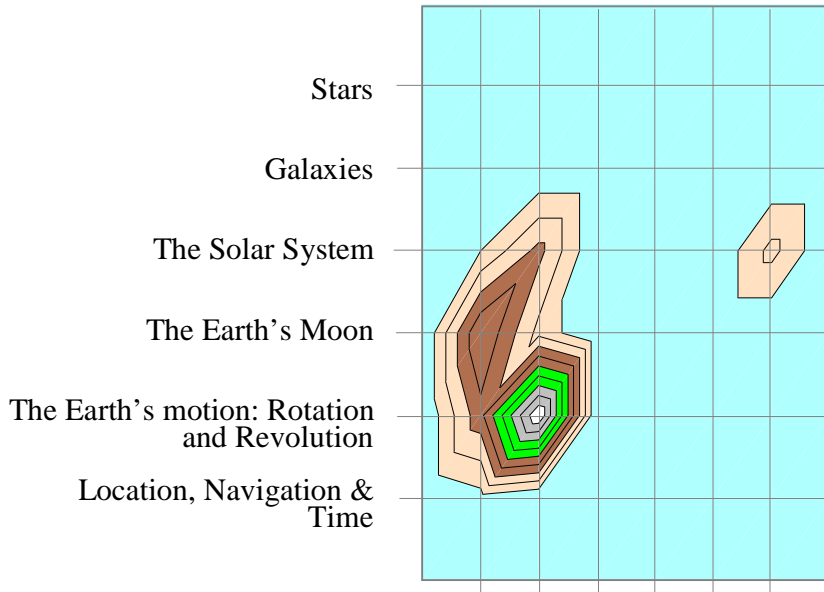


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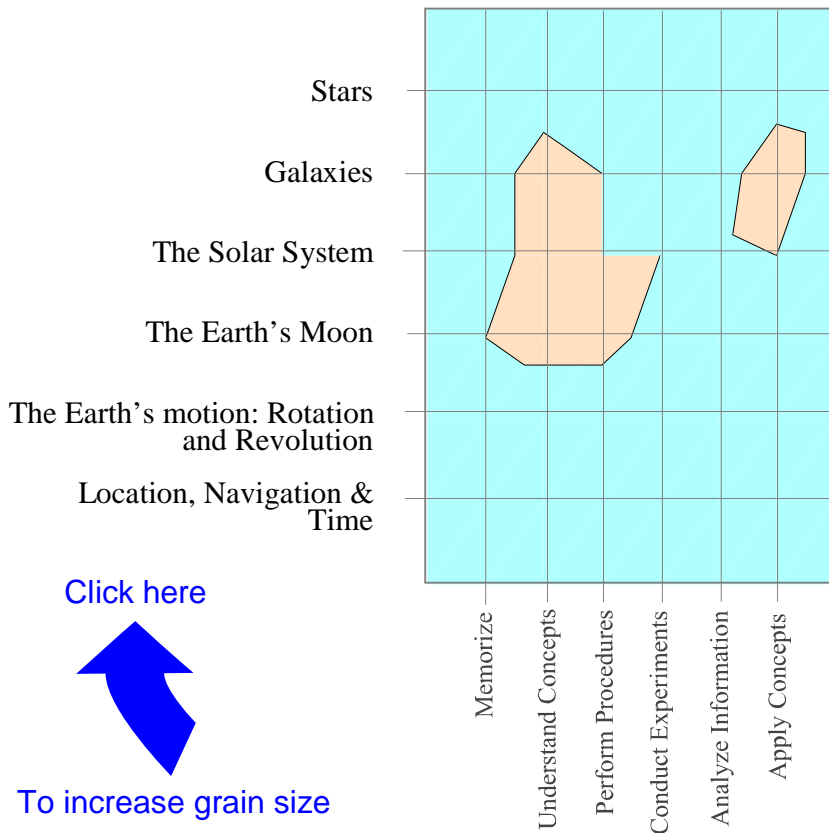
Grade 4 Science Astronomy Fine Grain Content Maps

Gr. 4 NAEP Assessment

Gr. 4 State Assessment



Teacher Reports (28)

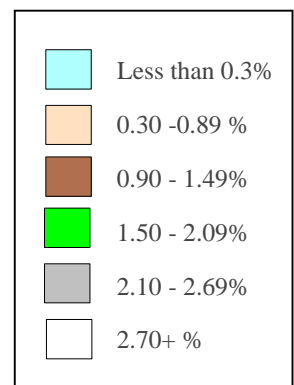


Alignment between Assessment
& Teacher Reports of Practice:

Instr. To State Test **.18**

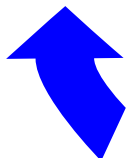
Instr. To NAEP Test **.24**

Percent of Instruction / Test



Measurement Interval = .3%

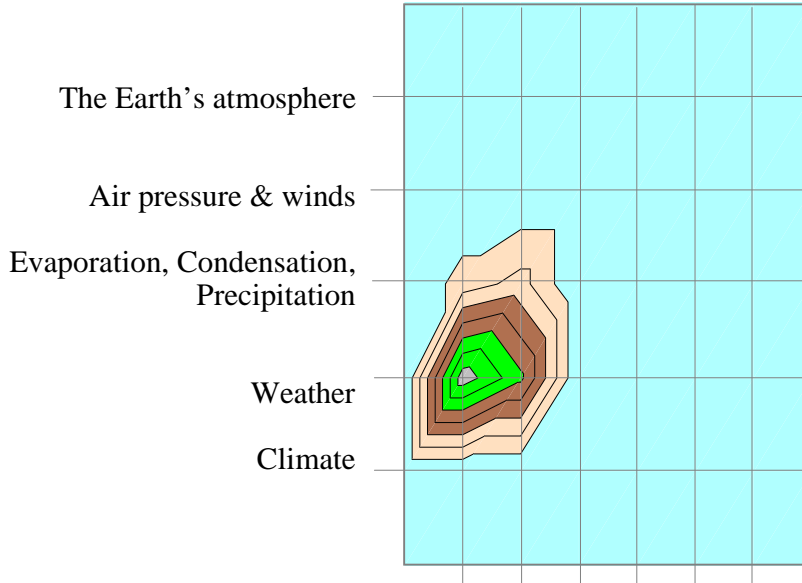
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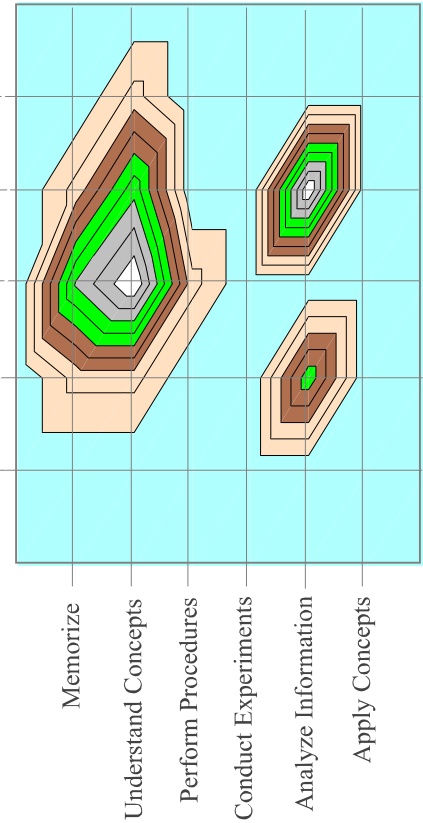
To increase grain size

Grade 4 Science Meteorology Fine Grain Content Maps

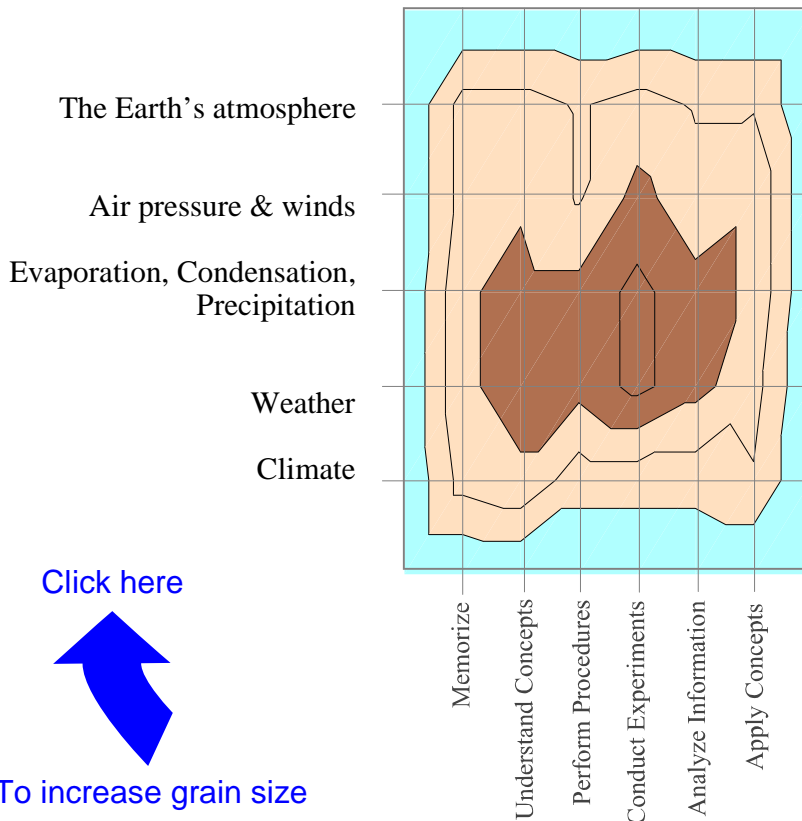
Gr. 4 NAEP Assessment



Gr. 4 State Assessment



Teacher Reports (28)

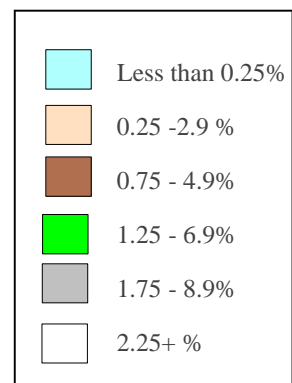


Alignment between Assessment
& Teacher Reports of Practice:

Instr. To State Test **.37**

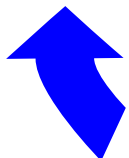
Instr. To NAEP Test **.20**

Percent of Instruction / Test



Measurement Interval = .25%

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To increase grain size