

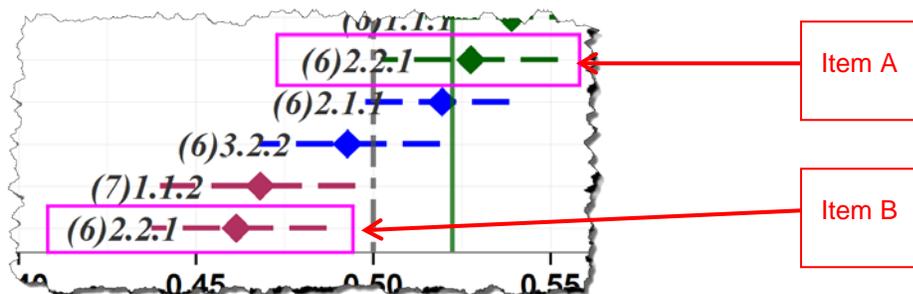
Science MCA Benchmark Reports

The Science MCA Benchmark Reports compare school-level performance with statewide performance on individual MCA items and their aligned benchmarks. The reports are a tool teachers can use to identify benchmarks and standards on which students in their school show performance above, below or at the same level *relative to all Minnesota science students in the same grade*.

The relative performance of students in a given school compared to all Minnesota students is reported using the Common Language Effect Size (CLES). The CLES expresses the probability that a student selected at random from the school would receive a higher score on the item than a student selected at random from students statewide. For each test item, the average statewide performance—whether it be low, high or in-between—would be 0.50 on the CLES scale, meaning a student drawn at random statewide has a 50/50 chance of exceeding the performance of another student drawn at random statewide on the item. CLES values greater than 0.50 indicate that student performance on the item at the school exceeds student performance statewide on the item. CLES values less than 0.50 have the opposite implication: school performance is lower than the statewide average on the item.

Relative Performance, NOT Item Difficulty

It is important to note that the CLES scale and the location of items on the scale **do not** provide information about the difficulty of individual test questions. It is not appropriate to make inferences about how easy or hard test questions were based on their location on the scale. An item showing high relative performance for students at the school could have a lower actual percentage of students getting the item correct than an item showing low relative performance. In a hypothetical situation, let's say that 25% of students statewide answered Item A correctly and 60% of students at Willow Middle School answered it correctly. This difficult item will be displayed on the right side of the graph, indicating that Willow's students performed very well on the item relative to the state. On Item B, 95% of students statewide answered the item correctly while 75% of the Willow Middle School students got it right. This is an easy item that will appear on the left side of the graph, showing that performance on the item at Willow Middle School is below that of the state. More Willow Middle School students answered Item B correctly (75%) than Item A (60%), but they performed less well on Item B relative to all Minnesota students. The reports show only the difference between the performance of students in a school relative to the performance of all students. Neither percent correct for students statewide nor percent correct for students at the school are provided in the Benchmark Reports. Two points that are horizontally aligned on a graph may represent items with very different levels of difficulty.



How to Read the Science MCA Benchmark Reports

The reports for Grades 5 and 8 are organized by strands in the Minnesota Academic Standards for Science. The High School reports are organized by the substrands of the Nature of Science and Engineering and Life Science strands:

Grades 5 & 8	High School
Strand 1:Nature of Science and Engineering	Strand 1, Substrand 1:Practice of Science (POSS) Strand 1, Substrand 2:Practice of Engineering (POES)
Strand 2:Physical Science	Strand 1, Substrand 3:Interactions among STEM and Society (INTS)
Strand 3:Earth and Space Science	Strand 4, Substrand 1:Structure and Function in Living Systems (SFLS) Strand 4, Substrand 2:Interdependence Among Living Systems (IALS)
Strand 4:Life Science	Strand 4, Substrand 3:Evolution in Living Systems (EILS) Strand 4, Substrand 4:Human Interaction with Living Systems (HILS)

Within the graph for each strand, a vertical dashed line at the 0.50 position on the horizontal axis represents average statewide performance for each test item anchored at a CLES of 0.50. A vertical solid line represents the school's overall average performance on the test.

Test items and benchmarks

Individual items within each strand are indicated by color-coded points and error bands. The items are arranged from highest performance relative to the state at the top of the graph to lowest relative performance at the bottom. Color codes¹ represent how the school's students performed on the item compared to all students in the state:

- **Green:** Students performed significantly above the state average on the item.
- **Blue:** Students performed near the state average on the item.
- **Red:** Students performed significantly below the state average on the item.

Pay close attention to the amount of overlap of error bands across items. If error bands on items overlap by more than one-half, regardless of color or position, performance on those items may be considered statistically equivalent.

Benchmarks are indicated to the left of each item. The benchmark code has been shortened by removing the strand number. In order to match the code with the Minnesota Science Standards, the strand number must be inserted. In grades 5 and 8, for example, (8) 3.3.2 in the Nature of Science and Engineering (Strand 1) section corresponds to benchmark 8.1.3.3.2. In the high school reports, all benchmarks begin with 9, so the grade indicator--(9)--is omitted. The Strand indicators (Strand 1 or Strand 4) are also omitted. In the Strand 4, Life Science: Evolution in Living Systems section, for example, 3.1.2 corresponds to benchmark 9.4.3.1.2.

Interpreting the Benchmark Reports

As with any data, caution must be used in the inferences that can be made from the data. It is important to frame any interpretation in the context of the school's environment. Experience with the science curriculum, instruction and data from other classroom assessments is critical to making meaningful

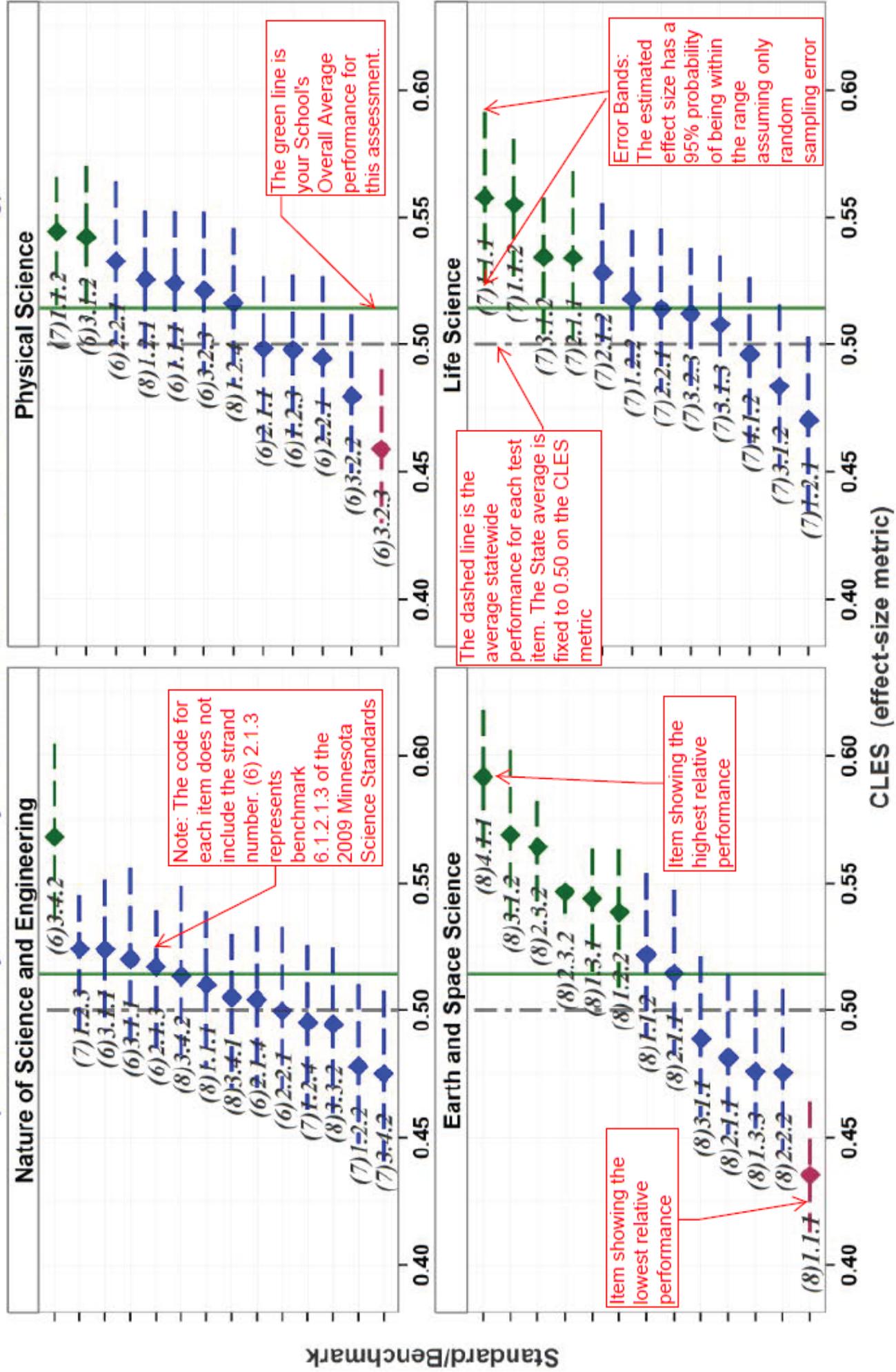
¹ It is not necessary to rely on the color codes to determine relative performance:

- Points to the right and with error bands that do not overlap the dashed vertical line indicate students performed significantly above the state average.
- Points with error bands that overlap the dashed vertical line indicate students performed near the state average.
- Points to the left and with error bands that do not overlap the dashed vertical line indicate students performed significantly below the state average.

inferences from this report. Any interpretation of these reports must take the following considerations into account:

- The number of items on each report corresponds to the number of items on the assessment, as outlined in the test specifications for each grade. This feature is specific to the Science MCA only.
- There may be more than one item assessing a particular benchmark.
- Color codes and position of items in the graphs do not correspond to item difficulty.
- Color codes and position of items in the graphs do not correspond to achievement levels (i.e., Does Not Meet, Partially Meets, Meets, or Exceeds the Standards).
- When looking at different schools within a district, be aware of any differences in the CLES scale. The horizontal axis comprising the CLES scale is adjusted to fit each individual school's data. Hence, if a school has a large outlier (very well or very poor performing item) the graph will have items placed more tightly together and more points on the horizontal axis.

MDE Benchmark Report based on Effect-Size
 Minnesota Middle School : G8 2013 MCA-III Science
 (Created by MDE Psychometrics, Division of Statewide Testing)



Significance ◆ Below Overall State Mean ◆ Near Overall State Mean ◆ Above Overall State Mean