Measuring growth in student performance on MCAS:

The growth model
Overview

• What is growth? Why are we doing this?
• How do we measure growth for students and groups?
• What have we learned so far?
• What will be available this fall?
What is growth?

• MCAS shows how each student is achieving relative to state standards
  - Is John proficient in 6th grade mathematics?
  - Cannot compare John’s scaled scores from year to year

• Growth measures change in an individual student’s performance over time
  - How much did John improve in mathematics from 5th grade to 6th grade?
    • Did John improve more or less than his academic peers?
Why measure growth?

• A way to measure progress for students at all performance levels
  - A student can achieve at a low level but still improve relative to his academic peers
  - Another could achieve well but not improve much from year to year

• Provides evidence of improvement even among those with low achievement

• Gives high achieving students and schools something to strive for beyond proficiency
Uses of growth data

- Reconceptualizing performance
  \[ \text{Performance} = \text{achievement} + \text{growth} \]

- Identifying strengths and weaknesses in student performance beyond traditional achievement data
- Targeting assistance
- Conducting program evaluations
- Eventually, making accountability decisions
Student growth percentiles

- Each student’s rate of change is compared to other students with a similar test score history ("academic peers").

- The rate of change is expressed as a percentile.
  - How much did John improve in mathematics from 5th grade to 6th grade, relative to his academic peers?
  - If John improved more than 65 percent of his academic peers, then his student growth percentile would be 65.
Growth to grade 7: Three students

Grade 5 2006  Grade 6 2007  Grade 7 2008

MCAS ELA scaled score

- Advanced: 80 to 99
- Proficient: 60 to 79
- Needs Improvement: 40 to 59
- Warning/Failing: 20 to 39
- 1 to 19

SGPs between 40 to 59 are typical

SGP

Gina

230

35% 65% 80 to 99

60 to 79

40 to 59

20 to 39

1 to 19
Growth to grade 7: Three students

Harry

Grade 5
2006

Grade 6
2007

Grade 7
2008

MCAS ELA scaled score

Advanced
Proficient
Needs Improvement
Warning/Failing

2006 2007 2008

244
248
248

75%
25%
Growth to grade 7: Three students

Ivy

<table>
<thead>
<tr>
<th>Grade 5</th>
<th>Grade 6</th>
<th>Grade 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>2007</td>
<td>2008</td>
</tr>
<tr>
<td>214</td>
<td>214</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>92%</td>
</tr>
<tr>
<td>8%</td>
<td>92%</td>
<td></td>
</tr>
</tbody>
</table>

MCAS ELA scaled score

- **Advanced**
- **Proficient**
- **Needs Improvement**
- **Warning/Failing**
Growth to grade 7: Three students

Gina, Harry, and Ivy

MCAS ELA scaled score

Grade 5
2006

Grade 6
2007

Grade 7
2008

Growth to grade 7: Three students

Gina, Harry, and Ivy

MPAS ELA scaled score

Advanced
Proficient
Needs Improvement
Warning/Failing

Grade 5
2006

Grade 6
2007

Grade 7
2008

Harry

Gina

Ivy

248
248
230
230
214
214

2006 2007 2008
# Growth to grade 7: Three students

## English language arts

<table>
<thead>
<tr>
<th></th>
<th>Grade 5 2006</th>
<th>Grade 6 2007</th>
<th>Grade 7 2008</th>
<th>SGP 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gina</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>35</td>
</tr>
<tr>
<td>Harry</td>
<td>248</td>
<td>248</td>
<td>244</td>
<td>25</td>
</tr>
<tr>
<td>Ivy</td>
<td>214</td>
<td>214</td>
<td>226</td>
<td>92</td>
</tr>
</tbody>
</table>
Interpreting student growth percentiles

Gina’s SGP was 35. This means her SGP in grade 7 was higher than 35 percent of her academic peers (and less than 65 percent).

- Is that amount of growth typical?
Key concepts

• Growth is *distinct from achievement*  
  - A student can achieve at a low level but grow quickly, and vice versa

• Each student is compared only to their *statewide academic peers*, not to all students statewide  
  - Others with a similar test score history  
  - All students can potentially grow at the 1st or 99th percentile

• Growth is *subject-, grade-, and year-specific*  
  - Different academic peer groups for each subject, grade, and year  
  - Therefore, the same change in scaled scores can yield different student growth percentiles

• The percentile is calculated on the *change in achievement*, not the absolute level  
  - Differs from more familiar norm-referenced measures
Growth for groups

• How to report growth for groups of students?
  - Districts, schools, grades, subgroups, classrooms

• Median student growth percentile
  - The point at which half of the students in the group have a higher growth percentile and half lower

• Growth distribution charts
  - The percentage of students in the group growing less than, similar to, or more than their academic peers
Imagine that the list of students to the left are all the students in your 6th grade class. Note that they are sorted from lowest to highest SGP.

The point where 50% of students have a higher SGP and 50% have a lower SGP is the median.

**Median SGP for the 6th grade class**

<table>
<thead>
<tr>
<th>Last name</th>
<th>SGP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lennon</td>
<td>6</td>
</tr>
<tr>
<td>McCartney</td>
<td>12</td>
</tr>
<tr>
<td>Starr</td>
<td>21</td>
</tr>
<tr>
<td>Harrison</td>
<td>32</td>
</tr>
<tr>
<td>Jagger</td>
<td>34</td>
</tr>
<tr>
<td>Richards</td>
<td>47</td>
</tr>
<tr>
<td>Crosby</td>
<td>55</td>
</tr>
<tr>
<td>Stills</td>
<td>61</td>
</tr>
<tr>
<td>Nash</td>
<td>63</td>
</tr>
<tr>
<td>Young</td>
<td>74</td>
</tr>
<tr>
<td>Joplin</td>
<td>81</td>
</tr>
<tr>
<td>Hendrix</td>
<td>88</td>
</tr>
<tr>
<td>Jones</td>
<td>95</td>
</tr>
</tbody>
</table>
Using median student growth percentiles: growth by achievement for schools

ELA % proficient or advanced, 2009

ELA median SGP, 2009

Higher achieving
Lower growing

Higher achieving
Higher growing

Lower achieving
Higher growing

Lower achieving
Lower growing
Growth distribution charts

<table>
<thead>
<tr>
<th>Percent of Students</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower growth</td>
<td>Madison: 17</td>
</tr>
<tr>
<td>Typical growth</td>
<td>Madison: 19</td>
</tr>
<tr>
<td>Higher growth</td>
<td>Madison: 20</td>
</tr>
</tbody>
</table>

Legend:
- <20th %ile
- 21st to 40th %ile
- 41st to 60th %ile
- 61st to 80th %ile
- >80th %ile
Rules of thumb

• Typical student growth percentiles are between about 40 and 60 on most tests.

• Students or groups outside this range has higher or lower than typical growth.

• Differences of fewer than 10 SGP points are likely not educationally meaningful.
Growth model pilot

• Tested data, reports, and materials with nine districts, April to July 2009
  - Community Day Charter School, Franklin, Lowell, Malden, Newton, Northampton, Sharon, Springfield, Winchendon

• Suggestions were incorporated into this fall’s statewide rollout
New insights: Growth vs. achievement

Grades 4, 5, 6 mathematics - All elementary schools in one district

Mathematics median SGP, 2008

Math % proficient or advanced, 2008

Higher achieving
Lower growing

Higher achieving
Higher growing

Lower achieving
Lower growing

Lower achieving
Higher growing
New insights: Impact of a new K-5 curriculum

Grade 4
- <20th %ile: 12
- 21st to 40th %ile: 17
- 41st to 60th %ile: 21
- 61st to 80th %ile: 30
- >80th %ile: 20

Median SGP: Grade 4: 58

Grade 5
- <20th %ile: 28
- 21st to 40th %ile: 20
- 41st to 60th %ile: 18
- 61st to 80th %ile: 22
- >80th %ile: 12

Median SGP: Grade 5: 43

Grade 6
- <20th %ile: 8
- 21st to 40th %ile: 9
- 41st to 60th %ile: 14
- 61st to 80th %ile: 18
- >80th %ile: 52

Median SGP: Grade 6: 83
New insights: Changes in pilot districts

- One discovered that its median student grew at only the 15th percentile from grade 3 to grade 4
  - Reconfiguring schools to avoid building transition in grade 4

- One found that buildings with full-time math coaches had stronger growth than buildings with part-time coaches
  - Revised coaching jobs to ensure full-time coverage

- One implemented training on growth for all principals district-wide
What data are available?

• Grades 4 through 8, ELA and mathematics
  - 2008 and 2009

• Grade 10, ELA and mathematics (measures the change from grade 8 to grade 10)
  - Only available for 2009
Next steps

• Data were released to districts on Oct. 2\textsuperscript{nd} in the Data Warehouse

• Public release of aggregate data on Oct. 27\textsuperscript{th}

• Web site, written materials, workshops, and other communications and PD to help district staff understand and use the measure
For more information

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or
781-338-3282

Growth Data Interpretation Questions
growth@doe.mass.edu
http://www.doe.mass.edu/mcas/growth/