Strategies for Improving District-Determined Measures in the Academic Content Areas:

Guidance for Using the Post-Test Only Approach to Measure Student Growth

June 6, 2014
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Introduction: Purpose of This Guidance Document

Educators and administrators engaging in the selection and/or development of district-determined measures (DDMs) have been challenged with answering a key question about their emerging DDMs: Does this measure detect some type of change in performance that can be attributed to student growth? In a key resource developed to support districts with this challenge, the Massachusetts Department of Elementary and Secondary Education (ESE) explains why it is so important that a DDM measure growth:

Students come to school each year with a wide range of prior academic achievement and therefore begin their next year of instruction with varying levels of readiness to access the curriculum, a situation that is beyond the control of the educator assigned to teach them. Measuring educators’ effectiveness solely by the achievement level of their students cannot account for these prior conditions. By comparison, measuring growth can help level the playing field. Improvement in student performance is a more meaningful and fair basis for determining the trends and patterns that will yield the educator’s rating of impact on student learning, growth, and achievement. (p. 8)

One strategy for supporting DDM developers in Commonwealth districts with this challenge is to provide concrete examples of open-source, locally developed assessments that are useful for the purpose of measuring student growth. The aim of sharing a sample of promising DDMs is to stimulate further discussion about how, with a few strategic changes, existing assessments may be adapted for use as DDMs. According to ESE, the strongest DDMs will emerge from districts that have engaged in systematic study of the appropriateness and usefulness of their assessments specifically for determining what students have learned from their educators during a course of instruction.

A number of approaches to measuring growth that are described in a key ESE-developed resource, Technical Guide B, do not require complex psychometric methods or statistical computations. Each of these approaches has unique strengths and limitations. Many measures can be adapted to a variety of approaches to measuring growth, so decision-makers will want to use their professional judgment in weighing the pros and cons of each, considering competing goals and determining the approaches best suited for their contexts.

This document is intended to support those educators and administrators who are considering a post-test only approach to measuring growth with their locally developed assessments.

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1 Massachusetts Model System for Educator Evaluation, Part VII: Rating Educator Impact on Student Learning Using District-Determined Measures of Student Learning, Growth, and Achievement.

2 Companion documents have been developed that highlight three other common approaches to measuring growth: (a) a pre-test/post-test approach; (b) a holistic evaluation approach; and (c) a repeated measures approach.
It includes the following:

- key resources developed by ESE that offer guidance for monitoring the technical quality of DDMs and for selecting a reasonable approach to measuring growth;
- a summary of the strengths and limitations of the *post-test only* approach to examining student growth;
- sample assessments submitted by Commonwealth districts, with suggestions for how the developers might refine each measure for use as a DDM; and
- information about a number of external resources that educators and administrators may find helpful if they elect to pursue a *post-test only* approach.

It is hoped that this guidance document will help district personnel transform strong locally developed measures of achievement and/or performance into promising DDMs that are particularly effective in evaluating student growth.
The post-test only approach involves a single administration of an assessment of what students know and can do following instruction. To measure growth with this approach, developers must collect additional information about students’ baseline knowledge and skills, i.e., what they know and can do prior to instruction. Post-test only measures typically include traditional direct measures such as summative exams (unit exam, mid-term or final exam, end-of-year test, or end-of-course exam) or nontraditional measures such as capstone projects. This approach also may use indirect measures (e.g., number of students electing more advanced courses in relevant content areas in subsequent years).

This approach has a number of strengths and limitations, based on guidance from experts in the educational research and measurement communities. These are summarized in Table 1.3

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3 See Appendix B for research- and measurement-based resources for the post-test only approach
### Table 1. Strengths and Limitations of the Post-Test Only Approach to Measure Student Growth

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Often the best approach when a measure of achievement or performance can only be administered once (e.g., building a house).</td>
<td>• Developers will need to consider how to capture baseline information within the same year or course and produce scores that could be compared to the post-test.</td>
</tr>
<tr>
<td>• Useful when an existing measure is strongly linked to instruction (e.g., curriculum-embedded assessment) or is a well-established external tool (e.g., certification exam or Advanced Placement test).</td>
<td>• Districts need to think carefully about how they are measuring students’ ability relative to where they started.</td>
</tr>
<tr>
<td></td>
<td>• Single-year scores are not precise indicators of educator performance because results are confounded by cohort effect (i.e., different classes of students may be systematically different for reasons not related to instruction).</td>
</tr>
</tbody>
</table>

Districts interested in using the post-test only approach also may want to attend to the following considerations:

- Wherever possible, districts are also encouraged to use other approaches to measuring growth.

- One approach to using a post-test only model would be to identify key knowledge or skills that are taught during the year or course and develop a test/task or scoring method that allows educators to measure growth. To promote confidence in findings, the baseline test/task should be strongly aligned to and similar to the post-test. In most cases, however, it should not be exactly the same as the post-test. The post-test only approach differs from the pre-test/post-test approach in this important way.

- It is critical to include comparative baseline information that helps predict the expected level of achievement, such as the difference from the previous unit’s test or previous year’s graduation rate.

- A measure must be of exceptionally high quality in terms of content alignment and usefulness to justify this approach.

- DDM teams also will want to consider item quality, test length, accessibility for all students, and when and how the measure is administered and scored.
Section II. Example Assessment #1, Using the Post-Test Only Approach to Measure Student Growth

The following assessment was submitted by the Mathematics Department Chair at Scituate Public Schools and was developed by a team of educators who adapted an existing measure for use as a DDM. For more information about the midterm exam or to obtain the final exam, please contact Dr. John Ekstrom at jekstrom@scit.org.

Locally Developed Assessment Well-Suited for Use as a DDM
Submitted by: Dr. John Ekstrom, Mathematics Department Chair (K-12), Scituate Public Schools

Course/Grade: High School Mathematics
Assessment Name: Pre-Calculus Mid-Term Examination
Item Types: Constructed- and Selected-Response
Description: This midterm examination was developed by Scituate High School and Scituate Junior High School math department members. Test questions are aligned to the Massachusetts Mathematics Curriculum Framework in high school mathematics.

The midterm exam includes 14 constructed-response items. Some challenge students to find solutions in real-life contexts, such as hitting a baseball or driving to a popular destination, while others ask students to solve problems using sets of complex numbers. All items have multiple parts, requiring students to plot trajectories, apply quadratic models, and sketch graphs of functions in addition to solving problems.

The remaining 20 questions are selected-response items. These items are accompanied by five response options; “None of these” is an option in half of the items. All items require students to apply knowledge and skills that they were expected to learn in the first semester of instruction. For example, students are asked to estimate a slope, describe a scatter plot, identify intercepts, and demonstrate understanding of functions.

Following the pilot administration, educators found that the scores from the midterm exam correlated well with other measures of achievement, such as midterm grades.
Part I: Open-Response

1. David Ortiz hit one of Mr. Parkins’ fast balls (impossible, but pretend) when it was 2 feet off the ground above home plate. At a distance of 100 feet from home plate the ball was 152 feet high, and at a distance of 150 feet from home plate it was 82 feet high. Let x = the distance from home plate and let y = the height of the ball at distance x.

   a. What is the height of the ball when David Ortiz makes contact? (This should be EASY)
   b. Give a rough sketch of the path that the ball will travel while in the air, labeling the diagram with the points given above. Be sure to draw an xy-axis.
   c. Using the points labeled in your diagram, find the quadratic model for this motion using $y = ax^2 + bx + c$ (with or without a calculator)
   d. Find the maximum height reached by the ball
   e. How far from home plate will the ball be when it hits the ground (when $y = 0$)?

2. Given $f(x) = \frac{x^2 + x - 12}{x^2 - 3x}$
   a. Factor the numerator and denominator. If there are any holes, state where they occur.
   b. Identify the x-intercept(s) and y-intercept(s)
   c. Identify the horizontal asymptote(s)
   d. Identify the vertical asymptote(s)
   e. Sketch a graph of the function

3. Consider the function $f(x) = x^4 - 6x^3 + 18x^2 - 14x - 39$
   a. List all of the possible rational zeros.
   b. With the aid of your calculator, identify the rational zeros.
   c. Use synthetic division to find all of the remaining zeros (real or complex).
4. You are driving toward Mt. Washington in NH. At one moment, you measure the angle of elevation to the top of the 6,288-foot mountain to be 15.5°. You drive for 45 seconds longer and measure the angle of elevation to be 20.5°. How far did you drive between the first and second points?

   a. Draw and label right triangles depicting this problem.
   b. Find the horizontal distance from the first angle measure to the base of the mountain.
   c. Find the horizontal distance from the second angle measure to the base of the mountain.
   d. Determine the distance traveled.
   e. Determine the velocity of your vessel in feet per second.

Bonus: Determine the velocity of your car in mi/hr. Were you breaking the law or not?

**Part II. Solve the Problem**

1. Solve: \( x^2 - 3x - 10 = 0 \)

2. Solve: \( x^2 + 6x - 3 = 0 \)

3. Find all real zeroes of: \( f(x) = x^3 + 2x^2 - 81x - 162 \)

4. Find the horizontal and vertical asymptotes of:

   \[ f(x) = \frac{x^2 + x - 2}{x + 1} \]

5. Solve: \( \log(200x) - \log(x + 2) = 2 \)

6. Solve: \( \sin x = -\frac{1}{2} \)

7. Solve: \( 2^x = 8^{x-3} \)

8. Solve: \( 2\ln(x) - 8 = 4 \)

9. Solve: \( e^{2x} - 6e^x = 7 \)

10. Find \( \tan(\theta) \) if given \( \cos \theta = \frac{\sqrt{3}}{2} \) and \( \sin \theta < 0 \)
Part III. Multiple Choice

1. Estimate the slope of the line.

![Graph of a line](image)


2. Estimate the correlation represented below

![Scatter plot](image)

[a] zero correlation  [b] positive correlation  [c] negative correlation  
[d] no discernible correlation  [e] infinite correlation

3. The x-intercepts of \( y = x^4 - 81 \) are

[a] (3,0) and (-3,0)  [b] (0,0) and (0,3)  [c] (0,3) and (0,-3)  
[d] (0,3) and (0,-3)  [e] (3,-3) and (0,0)

4. Find two positive real numbers whose product is a maximum and whose sum is 20.

[a] 18, 38  [b] 20, 0  [c] 14, 6  [d] 4,16  [e] 10,10

5. Determine the equation of the vertical and horizontal asymptotes of the function \( f(x) = \frac{4x}{x-3} \)

[a] x = 0; \( y = \frac{4}{3} \)  [b] y = -3; \( x = 4 \)  [c] y = 1; \( x = 3 \)  
[d] y = 4; \( x = 3 \)  [e] x = -4; \( y = -\frac{4}{3} \)

6. Determine the domain of \( f(x) = \frac{1}{x^2-1} \)

[a] All real numbers except \( x = -1 \) and 2  [b] All real numbers except \( x = -1 \) and 1  
[c] All real numbers except \( x = -1 \) and -2  [d] All real numbers except \( x = 1 \) and 2  
[e] All real numbers
7. Divide $\frac{x^3+7x-2}{x+4} = ?$

- [a] $x^2 + 4x + 90 + \frac{23}{x+4}$
- [b] $x^2 + 4x - 9 - \frac{23}{x+4}$
- [c] $x^2 - 4x + 23$
- [d] $x^2 - 4 + \frac{90}{x+4}$
- [e] $x^2 - 4x + 23 - \frac{94}{x+4}$

8. The graph of $f(x) = \frac{x^2+3x+2}{x^2+5x+6}$

- [a] has a root at -2
- [b] has a root at 1
- [c] has a horizontal asymptote at $y = 0$
- [d] has a horizontal asymptote at $x = -2$
- [e] has a hole at $x = -2$

9. Which of the following is most likely the graph of $y = \ln(x)$?

- [a]

- [b]

- [c]

- [d]

- [e] None of these
10. Which of the following is most likely the graph of \( y = e^x \)?

![Graph Options](image1)

[a] ![Graph 1](image2)

[b] ![Graph 2](image3)

[c] ![Graph 3](image4)

[d] ![Graph 4](image5)

[e] None of these

11. Determine the zeros of the rational function \( f(x) = \frac{x^2-100}{(x-10)} \)

[a] \( x = 10i, -10i \)  
[b] \( x = -10, 10 \)  
[c] \( x = 10 \)  
[d] \( x = -10 \)  
[e] no zeroes exist

12. The value of \( \cos\left(\frac{5\pi}{6}\right) \) is _________.

[a] \( \frac{1}{2} \)  
[b] \( -\frac{1}{2} \)  
[c] \( \frac{\sqrt{3}}{2} \)  
[d] \( -\frac{\sqrt{3}}{2} \)  
[e] None of these
13. The value of $\sin \left(\frac{4\pi}{3}\right)$ is __________
   [a] $\frac{1}{2}$   [b] $-\frac{1}{2}$   [c] $-\frac{\sqrt{3}}{2}$   [d] $-\frac{\sqrt{3}}{2}$   [e] None of these

14. Rewrite $\log_2(\frac{1}{4}) = -2$ in exponential form
   [a] $2^2 = -2$   [b] $2^{-\frac{1}{2}} = -2$   [c] $2^{-2} = \frac{1}{4}$   [d] $\frac{1}{4} - 2 = 2$   [e] None of these

15. Evaluate $\log_2 \frac{1}{8}$
   [a] $-2$   [b] $-3$   [c] $-4$   [d] $27$   [e] None of these

16. Solve for $x$: $\log_4 2^6 = x$
   [a] 9   [b] 5   [c] 3   [d] 2   [e] None of these

17. Determine the quadrant in which the angle $\frac{14\pi}{5}$ lies.
   [a] I   [b] II   [c] III   [d] IV   [e] None of these

18. Find the complement and supplement to the angle $\frac{5\pi}{6}$
   [a] $\frac{\pi}{6}$ and $\frac{\pi}{6}$   [b] $\frac{\pi}{6}$ and $\frac{\pi}{4}$   [c] none and $\frac{\pi}{6}$   [d] $\frac{\pi}{3}$ and $\frac{\pi}{6}$   [e] None of these

19. Rewrite the angle $15^\circ$ in radian measure
   [a] $\frac{\pi}{3}$   [b] $\pi$   [c] $\frac{2\pi}{3}$   [d] $\frac{5\pi}{6}$   [e] None of these

20. If $\ln x = 6$ then $x =$ ?
    [a] 0   [b] 6   [c] 106   [d] $e^6$   [e] None of these
Section III. Suggestions for Refining Example Assessment #1 to Ensure Usefulness as a DDM

This mid-term examination, developed by a team of experienced Massachusetts educators, is intended to measure what students know and can do following a semester of instruction in pre-calculus. It also may be well-suited for use as one measurement point for a DDM if additional steps are taken to transform it into an effective assessment of growth.

Suggestions for refining this assessment are shared to illustrate some of the possible ways in which districts might, with slight modification, use existing assessments as DDMs.

**Suggestion 1: Develop a measure of baseline knowledge and skills.** A midterm examination is intended to measure achievement at one key point in time—a midpoint in a school year or course. This type of assessment can help educators determine the degree to which students have reached the intended instructional goals at that time point, but used alone, it does not allow educators to draw conclusions about how much a student has learned over the course of a period of instruction, because what students knew and could do prior to instruction—their baseline status—is not clear.

District personnel interested in using this type of assessment as a DDM might consider different strategies for collecting that baseline information. One approach might be to use evidence of prerequisite learning from a previous course. For example, the prerequisites for a high school pre-calculus course may be algebra I, algebra II, and geometry. If two students performed at the same level on the midterm examination, but one of those students entered with a relatively weaker baseline foundation in algebra and geometry skills, it would be reasonable to conclude that this student demonstrated greater growth in the time period prior to the midterm exam. Thus, a pre-calculus educator might collect information about students’ prior grades in prerequisite courses. The goal is to gain a sense of what students know and can do upon course entry, so that the midterm examination will accurately reflect how students have built upon those baseline skills through instruction delivered prior to that administration.

A district also may decide to administer a subset of items from the midterm examination at the beginning of the school year, with the score on that measure serving as a pre-instruction baseline indicator for each student. Educators can collaborate in identifying those items that are best suited for this purpose. Using their professional judgment, educators may select those items that measure content and skills centrally linked to the period of instruction prior to the midterm exam. Decision-makers should look for those items that they believe most students could not answer correctly prior to instruction but many will be able to answer correctly at the middle or end of the year.
Educators also may decide to modify some of the existing items so they are simplified versions of the original items; doing so may ensure that students are presented with items that are not so overwhelming or complex that they discourage students from attempting to solve the problem or craft a response. For example, an educator might not expect students to be able to create a graph of a quadratic equation at the beginning of the year, but might expect most entering students to know how to create a graph of a linear equation. Since those skills are closely linked, including an item that assesses students’ grasp of knowledge that is foundational to subsequent coursework increases the likelihood that the baseline measure will provide information that can be used to plot student growth and will be useful for instructional planning. Scores from this baseline measure can then be compared to scores from the midterm exam to provide evidence of gains over time, which may be attributed to student growth.

Importantly, to be a truly effective DDM, the measure should be linked to content from across the entire year or course of instruction. To meet this goal, district educators will need to ensure that the baseline assessment includes a strategic subset of items from both the midterm exam and the final exam. Using the previously described content sampling approach, educators can select those items that measure the content (knowledge and skills) to which most students will not have been exposed prior to instruction.

The district will want to consider the number of items on the baseline assessment that are necessary to ensure that sufficient information is collected to inform decision-making about student growth without creating undue burden to students or taking too much time from instruction. As a starting place, districts may want to consider developing a measure with 40–50 items. The baseline assessment would then include approximately 20–25 items that measure knowledge and skills taught prior to the mid-term exam and 20–25 items that measure knowledge and skills taught between the midterm and final exams. Test developers will want to label each item so that which period of instruction it is linked to is clear. This will facilitate calculation of a growth score for each period (e.g., semester) of instruction, as described in the following suggestion.

**Suggestion 2: Calculate growth scores for each student.** Following administration of the midterm and final exams, district personnel can compute two gain scores for each student: (1) Gain Score 1, the number correct on the new baseline test subtracted from the number correct on the midterm exam, using only the items labeled as linked to instruction delivered prior to the midterm exam; and (2) Gain Score 2, the number correct on the new pre-test subtracted from the number correct on the final exam, using only the items labeled as linked to instruction delivered after the midterm exam. They can then combine these subscores into a composite score for each student by calculating the grand total (Gain Score 1 + Gain Score 2) and then

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4 This method assumes that the midterm exam focuses on content taught during the first semester of instruction, while the final exam focuses on content taught during the second semester of instruction.
dividing the composite score by 2 to yield a mean gain score. This mean gain score will serve as the overall growth calculation for that student. Districts pursuing this approach may want to compare students’ growth scores with their scores on indicators of achievement, such as grades on the midterm and final exams and/or on major assignments.
Section IV. Example Assessment #2, Using the Post-Test Only Approach to Measure Student Growth

The following scoring rubric and final assignment were developed by educators from three schools in the Franklin Public School District. This example assessment was submitted by Jane Hogan, K-12 Arts Director, from that district. Additional information can be obtained by contacting: hoganj@franklin.k12.ma.us.

Locally Developed Assessment Well Suited for Use as a DDM
Submitted by: Jane Hogan, K-12 Arts Director, Franklin Public Schools (FPS)

Course/Grade: Visual Arts, Grade 7
Assessment Name: Grid Portrait with Color Value
Item Type: Project-Based Rubric and Self-Reflection Form

Description: During the 2013-2014 school year, three middle school art educators in FPS developed a Portrait Drawing Unit for grade 7 students. These educators were committed to developing a DDM that was linked to a deep learning unit tied to the Massachusetts Arts Curriculum Framework, with properly planned, documented, and sequenced instruction and consistency in the instruction and assessment across schools. During the course of this new unit, students are instructed on establishing proper facial proportions, drawing individual parts of the face, accurately using color values (shading), and using a grid system to draw the face more precisely. The art educators worked collaboratively to develop a common rubric for assessing student work at the end of the unit and a student self-reflection form.

Instruction is focused on creating accurate proportions and using color value to develop well-rendered portraits. Students create value scales to show the spectrum of colors that can be used when drawing portraits. Students complete a “Parts of the Face” handout which focuses on each of the main facial features (eyes, nose, and mouth). Students draw each of the features individually and then draw them together as a group with the instructor. They also create grid drawings from photographs, working to refine their skills and achieve increasingly more accurate proportions over time.

At the end of the unit, students are asked to demonstrate what they have learned using a grid system over their photograph to aid with proportions and shading techniques. In addition, they submit a completed color value scale. Students’ work products are scored against a unit-specific rubric. Students also complete a self-reflection form that encourages them to evaluate their own skill development throughout the unit. Students frequently express pride in what they have learned to do and a sense of accomplishment in the improvement in the quality of their work over time.

Note: The educators who developed this unit ask students to draw a portrait prior to instruction so they can have evidence of how much their portrait-drawing skills have improved over time. The current scoring rubric, however, is not designed to measure growth.
Franklin Public Schools  
Middle School Art Rubric

Name: ___________________________  
Project: Grid Portrait with Value  
Class: ____________________________

<table>
<thead>
<tr>
<th>Category</th>
<th>MA State Art Standards</th>
<th>Exceeds Standards</th>
<th>Proficient/Meets Standards</th>
<th>Needs Improvement</th>
<th>Does Not Meet Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Materials and Techniques</strong></td>
<td>Standard #1</td>
<td>(5 pts.)</td>
<td>(4 pts.)</td>
<td>(3 pts.)</td>
<td>(2 pts.)</td>
</tr>
<tr>
<td>Properly cares for and applies graphite/ebony pencil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Skill Development</strong></td>
<td>Standard #3</td>
<td>(5 pts.)</td>
<td>(4 pts.)</td>
<td>(3 pts.)</td>
<td>(2 pts.)</td>
</tr>
<tr>
<td>Demonstrates powers of observation and expression, is able to capture proportions and value correctly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Craftsmanship and Effort/Participation</strong></td>
<td>Standard #4</td>
<td>(5 pts.)</td>
<td>(4 pts.)</td>
<td>(3 pts.)</td>
<td>(2 pts.)</td>
</tr>
<tr>
<td>Demonstrates persistence to develop and complete quality, presentation ready work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Design/Composition</strong></td>
<td>Standard #2</td>
<td>(5 pts.)</td>
<td>(4 pts.)</td>
<td>(3 pts.)</td>
<td>(2 pts.)</td>
</tr>
<tr>
<td>Demonstrates knowledge and use of line, proportion and value</td>
<td></td>
<td></td>
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<tr>
<td><strong>Planning and Revising</strong></td>
<td>Standard #4</td>
<td>(5 pts.)</td>
<td>(4 pts.)</td>
<td>(3 pts.)</td>
<td>(2 pts.)</td>
</tr>
<tr>
<td>Effectively uses class time to draft and refine design</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Requirements</strong></td>
<td>Standard #4</td>
<td>(5 pts.)</td>
<td>(4 pts.)</td>
<td>(3 pts.)</td>
<td>(2 pts.)</td>
</tr>
<tr>
<td>Standard #3</td>
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</tr>
<tr>
<td>Standard #2</td>
<td></td>
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</tr>
</tbody>
</table>
| *Hands in all necessary work (portrait pre-assessment, parts of the face and final draft)  
  *Drawing shows accurate proportions and detail  
  *Pays attention to the value in their reference photo and applies to their drawing  
  *Creates well blended, smooth value and value transitions |                         |                   |                             |                   |                        |
| **Total Points:** ____ /30 points |                         |                   |                             |                   |                        |

Teacher Comments:  
Student Comments:

Created by Megan Goff, Stacy Johnson, Kristin Twigg 2013
Directions: Please complete the value scale below. Using your ebony pencil, #2 pencil, and your blending stub, try to create a gradual change in value from the darkest on the left, to the lightest on the right.

| Darkest Value |  |  |  |  | Lightest Value |

Value is the lightness or darkness of a color.  
White is the lightest possible value and black is the darkest possible value.
Student Self-Reflection Form

Portrait Drawing Self-Reflection

**Directions:** Please answer the following questions in complete sentences.

1. What did you feel was the most challenging part of drawing your portrait and why?

2. Do you feel like your ability to draw portraits has improved since the beginning of the unit? Why or why not?

3. Has your attitude towards drawing portraits changed since the beginning of the unit. Why or why not?
Section V. Suggestions for Refining Example Assessment #2 to Ensure Usefulness as a DDM

This unique unit assessment is designed to measure growth over the course of a unit of instruction in visual arts. It can easily be adapted for use to follow a number of different units of instruction. Student work samples are scored by teachers across multiple schools using a common rubric. A particular highlight is that students also submit a self-reflection form that promotes appreciation for learning and growth. Suggestions for refining this assessment are shared to illustrate some of the possible ways in which districts might, with slight modification, use existing assessments as DDMs.

**Suggestion 1: Develop a rubric designed to measure growth.** The educators who developed this unit ask students to draw a portrait prior to instruction, so that students can have evidence of how much their portrait-drawing skills have improved over time. However, the current scoring rubric is not designed to measure growth; instead, it evaluates a final product. How might districts interested in using this assessment develop a rubric designed to measure growth over time?

Growth rubrics include descriptions of performance that are intended to capture what high, moderate, and low growth look like for each criterion. A growth rubric asks the educator to look for evidence of knowledge or skill that was not demonstrated in earlier work but is demonstrated in later work, or evidence that a student’s work has improved in important ways over time. Effective growth rubrics will include educator-vetted descriptions of the types of changes in performance, over time, that are representative of each growth category; will clearly define the criteria for assigning a rating of low, moderate, or high growth; and will specify the types of evidence that might be cited to justify each rating.

Districts that are creating new growth rubrics might use it as an opportunity to reach agreement on the key elements of growth that are most closely linked to their instruction. They can craft common language that highlights those changes in knowledge or skills that are most representative of low, moderate, and high growth for each criterion (e.g., in the current assessment example, Materials and Techniques; Skill Development; Craftsmanship and Effort/Participation; Design/Composition; Planning and Revising; and Requirements). In some cases, they may decide that growth in one particularly important or highly valued criterion (e.g., Skill Development) will be used for determining students’ overall growth rating.

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**Suggestion 2: Calculate a composite score that can be used to set parameters for low, moderate, and high growth.** This assessment is designed to measure what students know and can do after one unit of instruction. To ensure that the DDM assesses valued content from across the school year, districts interested in pursuing this might consider using a composite score approach to transform this promising measure into an effective DDM.

With the composite score approach, at the end of the school year, participating educators might combine the point values that a student was assigned on each unit assessment (e.g., the total point tally on the example rubric) administered that year. The educators can then look at the distribution of scores across all students, from lowest to highest. For example, if five unit assessments are administered, and students can earn up to 30 points on each assessment, the range of possible composite scores may range from 0 to 150 points. The educators will use their professional judgment to set parameters for high, moderate, and low growth that are fair and reasonable. For example, educators using this approach might notice that many students’ composite scores are clustered around 75 points and decide that students with growth scores in the 50–100 point range will comprise the moderate-growth group. Students with composite scores in the 0–49 point range are then placed in the low-growth group, and students with composite scores in the 101–150 point range are placed in the high-growth group.
Appendix A: Key ESE-Developed Resources to Support Districts with Implementing DDMs that Effectively Measure Student Growth

August 2012

Part VII, Massachusetts Model System for Educator Evaluation: Rating Educator Impact on Student Learning Using District-Determined Measures of Student Learning

Overview of DDMs and related concepts. It will be most valuable for districts beginning to learn about this work.
http://www.doe.mass.edu/edeval/model/PartVII.pdf

Monthly Since February 2013

Educator Evaluator e-Newsletter

Monthly newsletter designed to be a timely resource that provides key information, updates, and answers to frequently asked questions.
http://www.doe.mass.edu/edeval/communications/newsletter/

March 2013

Introduction: District-Determined Measures and Assessment Literacy (Webinar Series #1)

ESE has developed a nine-part webinar series on DDMs and assessment literacy. This series is targeted at district teams engaged in the work of identifying and selecting DDMs (e.g., district- and school-based curriculum and assessment leaders). Resources from these webinars include the recorded webinar and materials from each session.
http://www.doe.mass.edu/edeval/ddm/webinar.html

April 2013

Basics of Assessment and Assessment Options (Webinar Series #2 and #3)
http://www.doe.mass.edu/edeval/ddm/webinar.html

Technical Guide A: Considerations Regarding District-Determined Measures

Designed to increase assessment literacy by introducing foundational assessment concepts. It will be most valuable to districts interested in learning more about technical assessment concepts.
http://www.doe.mass.edu/edeval/ddm/TechnicalGuide.pdf
April 2013 (continued)

Assessment Quality Checklist and Tracking Tool

An interactive tool, built in Microsoft Excel, that organizes and catalogs information about individual assessments into a districtwide tracker of all potential DDMs. It will be most valuable to districts working to identify and select measures across the district.

http://www.doe.mass.edu/edeval/ddm/webinar/Quality-Tracking-Tool.xlsm

July 2013

Determining the Best Approach to District-Determined Measures (Webinar Series #4)
http://www.doe.mass.edu/edeval/ddm/webinar.html

DDM Technical Assistance and Networking Session I

ESE-hosted technical assistance and networking sessions intended to build on the Assessment Literacy Webinar Series and provide participants an opportunity to engage with colleagues from other districts around critical planning and implementation questions related to the piloting and eventual implementation DDMs.

http://www.doe.mass.edu/edeval/ddm/webinar.html

August 2013

Measuring Student Growth and Piloting District-Determined Measures (Webinar Series #5)
http://www.doe.mass.edu/edeval/ddm/webinar.html

September 2013

Technical Guide B: Measuring Student Growth & Piloting District-Determined Measures

DDM Technical Assistance and Networking Session II
http://www.doe.mass.edu/edeval/ddm/webinar.html

October 2013

Determining How to Integrate Assessments into Educator Evaluation: Developing Business Rules and Engaging Staff (Webinar Series #6)
http://www.doe.mass.edu/edeval/ddm/webinar.html

Using Current Assessments in District-Determined Measures: Leveraging the Curriculum-Embedded Performance Assessments from the Model Curriculum Units
http://www.doe.mass.edu/edeval/ddm/UsingAssessments.pdf
December 2013

Ramping Up for Next Year: Strategies for Using Current Assessments as DDMs (Webinar Series #7)
http://www.doe.mass.edu/edeval/ddm/webinar.html

DDM Technical Assistance and Networking Session III
http://www.doe.mass.edu/edeval/ddm/webinar.html

January 2014

Communicating Results (Webinar Series #8)
http://www.doe.mass.edu/edeval/ddm/webinar.html

February 2014

Sustainability (Webinar Series #9)
http://www.doe.mass.edu/edeval/ddm/webinar.html

Implementation Brief: Scoring and Setting Parameters
http://www.doe.mass.edu/edeval/ddm/Scoring-ParameterSet.pdf

Implementation Brief: Investigating Fairness
http://www.doe.mass.edu/edeval/ddm/Fairness.pdf

Implementation Brief: Using Student Growth Percentiles
http://www.doe.mass.edu/edeval/ddm/GrowthPercentiles.pdf

March 2014

Implementation Brief: Indirect Measures and Specialized Instructional Support Personnel (SISP)
http://www.doe.mass.edu/edeval/ddm/IMSISP.pdf

April 2014

Implementation Brief: Administrators
http://www.doe.mass.edu/edeval/ddm/Admin.pdf

Implementation Brief: Considerations for English Language Learners
http://www.doe.mass.edu/edeval/ddm/ELLEducators.pdf

Implementation Brief: Considerations for Special Education
http://www.doe.mass.edu/edeval/ddm/SpecialEduEducators.pdf
# Appendix B: Recommended External Resources on Measuring Student Growth: Guidance from the Research and Measurement Communities

## Table 2. Research- and Measurement-Based Resources for Post-Test Only Approach

<table>
<thead>
<tr>
<th>Author</th>
<th>Resource</th>
<th>Topics Addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mark Wilson, University of California, Berkeley</td>
<td>Constructing Measures. (2005). Mahwah, NJ: Erlbaum.</td>
<td>This resource includes recommendations for ensuring that the student response format (e.g., selected response item, performance task) fits the content intending to be assessed in both traditional and non-traditional measures. Includes strategies for matching the critical content with the right type of test so results can be used for measuring growth. See especially Chapters 3 and 8.</td>
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