Pennsylvania Value-Added Assessment System (PVAAS)

Guide for Public Districts and Schools on PVAAS Reporting Released: September 20, 2011

PVAAS Data Supports:

- Raising Achievement
- Closing Achievement Gaps
- Decreasing Dropouts
- Increasing College Readiness
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**Student Achievement v. Student Progress**

- Student achievement and student progress are complementary but different types of academic measures.

  **Student Achievement**
  - The final result of an academic experience
  - Highly correlated with demographic factors, e.g., socioeconomic status
  - Affected by factors outside the school

  **Student progress**
  - Not correlated with demographic factors
  - Dependent on what happens as a result of schooling
  - This is the underlying concept of value-added analysis and reporting

**Achievement AND Progress**

- Achievement
  - Measures a student’s performance at one single point in time
  - Highly correlated with a student’s demographics
  - Compares student performance to a for growth
  - Critical to a student’s post-secondary opportunities

- Progress
  - Measures a student’s progress across time; i.e., across years
  - Not related to a student’s demographics
  - Compares student performance to his/her own prior performance
  - Critical to ensuring a student’s future academic success

- By measuring students’ academic achievement AND progress, schools and districts will have a more comprehensive picture of their own effectiveness in raising student achievement.

**The Concept of Value-Added**

To understand the concept of value-added analysis and reporting, imagine a child’s physical growth curve. Every year, a child stands up against the wall; the parent puts a ruler on his head and measures the child’s height at ages 2, 3, 4, and so on.

From these data points, the parent can construct a graph to illustrate the height of the child, as you see here, and then use these points to construct a graph of the growth of the child. Often, parents discover that this growth curve does not resemble the smooth line seen on a pediatrician’s chart. Instead, there are “dimples” and “bubbles” in this constructed graph. Children may have growth spurts. In addition, errors of measurement are possible; the child may not have stood straight or the parent did not hold the ruler level.

Now apply the same process to education. This graph measures growth for the same group of students for each grade. Imagine that a school has been testing each student annually in math and that the scores from these tests are used to construct each student’s math growth curve. The curve for any group of students will likely exhibit a pattern of dimples and bubbles similar to the physical growth curve seen for an individual child.

However, if by aggregating the information on many students we discover a dimple effect occurring in the 4th grade math at a specific school, then the dimple is evidence that the “standards-aligned system” for 4th grade math may need to be examined.

**PVAAS Data Provides Information to:**

- Raise Achievement
- Close Achievement Gaps
- Decrease Dropouts
- Increase College Readiness
Value-added follows the progress of students over time in order to estimate their growth during a year of schooling. With value-added assessment, educators get a sense of whether they are making appropriate academic progress for their students.

More specifically, value-added accomplishes this by following the same students over time thus looking at the progress of groups of students in order to make an estimate of educational effectiveness.

- These schooling influences accumulate across the years and measurably thus affecting students’ attainment at least four years beyond the grade in which the student encountered them.
- Without a value-added metric for measuring effective schooling, districts/schools have no way of knowing if they are capitalizing academic growth opportunities for all students.
- Student opportunities to progress each year must be maximized to allow more students to enroll in and be academically prepared for college and a career.

What is Value-Added?

- Value-added is a statistical analysis used to measure the district’s/school’s impact on the academic progress rates of groups of students from year-to-year.
- Conceptually and as a simple explanation, a value-added “score” is calculated in the following manner:
  - Growth = Current Achievement/current results compared to all Prior Achievement/prior results; with achievement being measured by an appropriate test, such as the PSSA.
  - Note: Simple approaches (comparing two scores) to value-added assessment yield results that are confounded by measurement error and several other issues of concern/quality.
  - The methodology used in Pennsylvania for value-added assessment is based on the EVAAS methodology. This methodology has been nationally peer reviewed and published.
  - Pennsylvania’s implementation of EVAAS is called the Pennsylvania Value-Added Assessment System (PVAAS).

The Benefits of Value-Added

- Value-added offers an objective, more accurate way to measure student progress and the influence districts/schools have on students’ educational experiences. With this information, educators are better able to:
  - Monitor the progress of all groups of students from low-achieving to high-achieving—thus ensuring growth opportunities for all students.
  - Measure the impact of educational practices, classroom curricula, instructional methods, and professional development on student achievement.
  - Make informed, data-driven decisions about where to focus resources to help students make greater progress and perform at higher levels.
  - Modify and differentiate instruction to address the needs of all students.
  - Align professional development efforts in the areas of greatest need.
  - Network with other districts/schools that may be yielding different growth results.
  - Identify best practices and implement programs that best meet the needs of their students.
A Look at PVAAS Reports:

NEW! Web-based Scatter Plots

District/School Value-Added Report

Value-Added Summary Report

District/School Performance Diagnostic Report

District/School Performance Diagnostic Summary Report

District/School Projection Summary

Student Projection Report

School Search

You will see the legends are the same for grades 4 through 8 and 9-11 reporting- reading, math, science and writing. While the legends and color codes are the same, the technical process behind the reporting uses a different statistical methodology. Therefore, this guide provides additional detail to describe the meaning of each set of reports - Grades 4 through 8, Reading and Math; and Science, Writing and 9-11 Reading and Math reporting.
New! Web-based Scatter Plots  
The Scatter Plot Report visually displays the growth and achievement of districts or schools. This report is useful in assisting a district or school to ascertain a better picture of student performance by providing information on both achievement (where students are) and growth (where students are headed).

What do we need to know about this report?  
If you set the scatterplot axes for PVAAS Growth Index and % Proficient or Advanced, this is how you would interpret the scatter plot:

1. If a school’s dot is in the first quadrant, this indicates that the tested students in this school have made adequate achievement and positive growth. The farther the school’s dot is away from the intersection of the boundaries, the higher the achievement and/or the greater the evidence of growth. Some apply the term “Excelling” to schools in this quadrant.

2. If a school’s dot is in the second quadrant, this indicates that the school made adequate achievement but negative growth. Negative growth should be of great concern since continued adequate achievement may be in jeopardy. Some apply the term “Slipping” to schools in this quadrant.

3. If a school’s dot is in the third quadrant, this indicates that the school made below adequate achievement and negative growth. This situation suggests that substantial investigation and remediation is necessary since the students are not achieving and are headed in the wrong direction. Some apply the term “Underperforming” to schools in this quadrant.

4. If a school’s dot is in the fourth quadrant, this indicates the school did not make adequate achievement; however, their growth is positive. This situation may indicate that interventions implemented are producing positive results. Some apply the term “Improving” to schools in this quadrant.
District/School Value-Added Report for Grades 4 through 8 in Reading and Mathematics

The Value Added Report provides educators with information to assist them in evaluating the overall effectiveness of a district/LEA or school on the academic progress of groups of students. At a glance, this report indicates if the district/LEA or school met or exceeded the standard for PA Academic Growth in reading and/or mathematics for grades 4 through 8.

The two levels below the Growth Standard (Yellow and Red) can be understood using a medical analogy:

- A Yellow, or Y, is comparable to taking your temperature and recording a fever of approximately 100.5°F. It is unlikely that you would go to the emergency room with that temperature but this may warrant a call to the doctor’s office. We say that a Yellow indicates moderate evidence that the district/school did not meet the standard for PA Academic Growth.

- A Red, or R, indicator requires immediate attention, comparable to a temperature of perhaps 104.0°F. This temperature provides significant confidence that the patient needs immediate attention, just as a Red indicator provides significant evidence that the district/school did not meet the standard for PA Academic Growth.

In this same way, the Light Blue, LB, and Dark Blue, DB, indicators signify moderate and significant evidence of exceeding the standard for PA Academic Growth.

What do we need to know about this report?

- The numbers are reported in Normal Curve Equivalent (NCE) units. It is necessary to convert PSSA scaled scores to a common scale (NCEs) so a growth measure can be yielded. The use of NCEs allows PSSA scores in any school year and grade level to be compared across years.

- The Growth Measure, displayed for each grade, indicates how much movement a group of students has made on the NCE scale (ranges from 1 to 100) as compared to the previous year (all prior data is used to estimate previous year and current year’s performance). The Growth Measure is approximately the difference between the Estimated District/LEA (or School) NCE Score from the most recent year (2010 for example) and the previous year (2009 for example).

- The Growth Measure over Grades Relative to the Growth Standard is the average of the District’s (or School’s) Estimated Mean NCE Gain for each of the grades in the district/LEA or school. This value is an estimate of average growth for the entire district/LEA or school.
District/School Value-Added Report for Science, Writing, and Grade 9-11 Math and Reading

The Value Added Report provides educators with information to assist them in evaluating the overall effectiveness of a district/LEA or school on the academic progress of groups of students. This report indicates if the district/LEA or school met the standard for PA Academic Growth or exceeded the expected progress with their students in science (grades 4, 8, 11), writing (grades 5, 8, 11), and reading and/or math for grades 9-11.

![Table of Data]

What do we need to know about this report?

- The PVAAS District/School value-added reporting for Science, Writing and Math and Reading, grade 9-11, is expressed in PSSA scaled score points.

- The *Avg PSSA Score* displays the average of the observed (actual) PSSA scaled scores of all students tested at the specified grade level and subject area selected who have at least 3 prior data points. The *Avg %-ile* displays where the *Avg PSSA Score* falls in the distribution of scores for all students in Pennsylvania.

- The *Avg Predicted PSSA Score* displays the average of the predicted PSSA scaled scores of all students tested at the specified grade level and subject area selected who have at least 3 prior data points. The *Predicted Avg %-ile* displays where the *Avg Predicted PSSA Score* falls in the distribution of scores for all students in Pennsylvania.

- The *Growth Measure* is an estimate of a district's or school's influence on a group of students' academic progress since last tested in grade 8. The *Growth Measure* value is the difference between the students' actual scores (Avg PSSA Score) and their predicted scores (Avg Predicted PSSA Score). If students score as expected (i.e., students' observed scores are equal to their predicted scores), the estimated *Growth Measure* would be 0. The value of 0 indicates the group met the standard for PA Academic Growth or made their expected growth.
Value-Added Summary Report for Grades 4 through 8 for Reading and Math

The Value Added Summary Report provides educators with an overall look at the progress, or growth, of grade level groups of students by subject within each school across the entire district/LEA.

<table>
<thead>
<tr>
<th>School Name</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beaver Elementary School</td>
<td>8.8</td>
<td>1.9</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Bittersweet Elementary School</td>
<td>8.3</td>
<td>0.4</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Blue Bell Elementary School</td>
<td>4.8</td>
<td>3.4</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Blue Middle School</td>
<td>--</td>
<td>--</td>
<td>4.1</td>
<td>1.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Blue Violet Elementary School</td>
<td>2.3</td>
<td>6.9</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

The two levels below the Growth Standard (Yellow and Red) can be understood using a medical analogy:

- A Yellow, or Y, is comparable to taking your temperature and recording a fever of approximately 100.5°F. It is unlikely that you would go to the emergency room with that temperature but this may warrant a call to the doctor’s office. We say that a Yellow indicates moderate evidence that the school did not meet the standard for PA Academic Growth.
- A Red, or R, indicator requires immediate attention, comparable to a temperature of perhaps 104.0°F. This temperature provides significant confidence that the patient needs immediate attention, just as a Red indicator provides significant evidence that the school did not meet the standard for PA Academic Growth.

In this same way, the Light Blue, LB, and Dark Blue, DB, indicators signify moderate and significant evidence of exceeding the standard for PA Academic Growth.

What do we need to know about this report?

- The numbers are reported in Normal Curve Equivalent (NCE) units. It is necessary to convert PSSA scaled scores to a common scale (NCEs) so a growth measure can be yielded. The use of NCEs allows PSSA scores in any school year and grade level to be compared across years.
- The value displayed next to each school for the most recently tested year, is the Growth Measure for the specified grade and subject. The Growth Measure, displayed for each grade, indicates how much movement a group of students has made on the NCE scale (that ranges from 1 to 100) as compared to the previous year. A Growth Measure of 0 indicates that this group of students has maintained its position from the previous year in the statewide distribution of PSSA scores (baseline of 2006); this group has met the standard for PA Academic Growth.
- If a Green (G), Light Blue (LB), or Dark blue (DB) rating is listed for some schools but not others, it is beneficial for all schools to dig deeper and begin conversations involving questions such as, “How has this result been achieved?” and “How can we learn from this school to impact growth in other schools in our district?”
Value-Added Summary Report for Science, Writing, and Grade 9-11 Math and Reading

The Value Added Summary Report provides educators with an overall look at the progress, or growth, of groups of students by subject within each school across the entire district/LEA. This report indicates if schools met the standard for PA Academic Growth in science, writing and grade 9-11 math and/or reading.

<table>
<thead>
<tr>
<th>Estimated School Growth Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>School Name</td>
</tr>
<tr>
<td>Forest Green High School</td>
</tr>
<tr>
<td>Royal Purple High School</td>
</tr>
<tr>
<td>Sepia High School</td>
</tr>
<tr>
<td>Shadow High School</td>
</tr>
<tr>
<td>Wild Watermelon High School</td>
</tr>
<tr>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

What do we need to know about this report?

- The data on the PVAAS Value-Added Summary reports for Science, Writing and Math and Reading, grade 9-11, are expressed as PSSA scaled score points.

- The Value Added Summary Report provides educators with an overall look at the progress, or growth, of grade level groups of students by subject within each school across the entire district/LEA. This report indicates if schools met or exceeded the standard for PA Academic Growth in science, writing and grade 9-11 math and/or reading. The numbers displayed next to each school for the most recently tested year, is the Growth Measure.

- The Growth Measure is an estimate of a school's influence on a group of students' academic progress. The School Effect value is the difference between the students' actual scores (Avg PSSA Score) and their predicted scores (Avg Predicted PSSA Score). These two scores can be viewed on the School Value-Added Report by clicking on the School Name that is displayed as a hyperlink on this report. If students score as expected (i.e., students' actual scores are equal to their predicted scores), the estimated Growth Measure would be 0. The value of 0 indicates that the group met the standard for PA Academic Growth.
**District/School Performance Diagnostic Report**

The Performance Diagnostic Report allows educators to view growth disaggregated by predicted PSSA performance levels (Below Basic, Basic, Proficient, and Advanced). This report can be viewed for an entire grade level or for different demographic subgroups within a specified grade and subject.

**What do we need to know about this report?**

- The key element of understanding and interpreting the Performance Diagnostic Report is in the location of the red whisker, or I-bar. The interpretation of the report depends on where this red whisker is located in relation to the green growth line.

- For Math and Reading (Grades 4 through 8), the location of the red whisker indicates whether the group of students made more than a year of growth, a year of growth or less than a year.

- For Science (Grades 4, 8, & 11), Writing (Grades 5, 8, & 11) and Math and Reading (Grades 9-11), the location of the red whisker indicates whether the group of students performed better than expected, as expected or less than expected.
The Performance Diagnostic Summary Report provides educators with a district-wide summary of the growth data provided in the Performance Diagnostic Reports. This is the same information as displayed on the Performance Diagnostic Report – this report, however, allows educators to view multiple schools or grades on one report.

### What do we need to know about this report?

- The standard for PA Academic Growth or one year’s worth of growth for grades 4 through 8, reading and math is a value of 0.

- Following the Growth value in each cell, the number of students in the predicted PSSA performance level group is provided in parentheses. When there are fewer than five students* in a predicted PSSA performance level subgroup, the number of students in the subgroup is reported, but the Growth value is omitted.

- Students are only included in this report if they have (1) at least two years (three data points) of prior PSSA data and (2) the previous year’s PSSA score in the same subject. A minimum of two years’ prior data are needed in order for the student to be placed into a predicted PSSA performance level. Hence, students without sufficient historical data (previous year’s PSSA score in the same subject AND at least two years of prior PSSA data) are not included in this report.

*Note: No Growth value is provided for the predicted PSSA performance level subgroups with fewer than five students as the Standard Error becomes too large for the value to have practical meaning.
District/School Performance Diagnostic Summary Report Math and Reading (Grades 9-11); Science (Grades 4, 8, 11); and Writing (Grades 5, 8, 11)

The Performance Diagnostic Summary Report provides educators with a district-wide summary of the growth data provided in the Performance Diagnostic Reports. This is the same information as displayed on the Performance Diagnostic Report – this report, however, allows educators to view multiple schools or grades on one report.

What do we need to know about this report?

- The Growth value is reported in PSSA scaled score points and is displayed for each predicted PSSA performance level subgroup in the row(s) labeled as the current year’s Growth. Growth is a measure of the progress of the students in the predicted PSSA performance level groups by reporting the approximate difference between the observed (actual) and predicted performance for the students in each predicted performance level group. The standard for PA Academic Growth is met when the observed performance is approximately at the same level as the predicted performance.

- It is important to remember that Growth is represented in PSSA scaled score points for the reporting in Grades 9-11 Reading and Math, as well as for all reporting for Science and Writing. This is different from the reports based on the Growth Standard methodology.

- Following the Growth value in each cell, the number of students in the predicted PSSA performance level subgroup is provided in parentheses.

- When there are fewer than five (5) students in a predicted PSSA performance level group, the number of students in the subgroup is reported, but the Growth value is omitted as the Standard Error becomes too large for the value to have practical meaning.

- Looking for patterns of progress, or growth, across schools may provide very useful data for district and school administrators and teachers to consider. When doing so, it is important to look at the same grade level for the most recent year. Educators should look for evidence of consistency, or a lack of consistency, across schools.
**District/School Projection Summary**

The District/School Projection Summary Reports provide educators with a visual display of how groups of students are predicted to perform on a future PSSA based on all prior testing history. Students who have insufficient history of PSSA testing or were retained in a grade do not have a PVAAS projection to the next tested grade level; therefore, they are included in the White piece of the pie chart (students who lack sufficient data).

| Students whose probability of reaching proficient or above is greater than or equal to 70% |
| Students whose probability of reaching proficient or above is between 40% and 70% |
| Students whose probability of reaching proficient or above is less than or equal to 40% |
| Students who do not have a projection due to a lack of sufficient data |

**How do the Projection Summary Reports differ?**

The **District (Grade Spans) Projection Summary Report** allows educators to view a district-wide summary of the possible future of students’ PSSA performance. This report provides educators with the probability that students within various grade spans will score at or above a Proficient level and/or at/above Advanced on a future PSSA.

The **District (Single Grade) Projection Summary Report** allows educators to view a grade level summary of the possible future of students’ PSSA performance. Dependent upon the last grade level tested, projections are available in Reading and Math to grades 4 through 8, and 11; in Science to grades 4, 8, and 11; and in Writing to grades 5, 8, and 11.

The **School (Grades Last Tested) Projection Summary Report** is the only report available that allows educators to view a school-wide summary of the possible future of PSSA performance of students tested in the school.

The **School (Single Grade) Projection Summary Report** allows educators to view a grade level summary of the possible future of student’s PSSA performance within a specific school. Dependent upon the last grade level tested, projections are available in Reading and Math to grades 4 through 8, and 11; in Science to grades 4, 8, and 11; and in Writing to grades 5, 8, and 11.
Student Projection Report

The Student Projection Report is the only report available that allows educators to view the possible future academic performance of an individual student in reading, math, science and/or writing. This report provides educators with the likelihood that a student will reach a particular PSSA performance level on a future PSSA assessment, assuming the average learning experience of the school the student will most likely attend, given the student’s current academic history.

What do we need to know about these reports?

- The Student Projection Reports are valuable information for administrators to use for intervention planning, resource allocation, course placement decisions, school improvement planning, and strategic planning. For teachers, the Student Projection Reports provide another critical piece of information on each student so that teachers can modify instructional strategies and classroom practices to best meet the needs of all students.

- When reviewing student projection probabilities, ranges to consider may be:
  - 70-100% -- Students with probabilities within this range have a high likelihood of reaching that performance level or higher.
  - 40-70% -- Students with probabilities within this range may not reach the targeted performance level or higher unless they receive additional educational supports.
  - 0-40% -- Students with probabilities within this range have a low likelihood of reaching the performance level or higher unless a major change is made to their educational program.

- Teams of teachers may discuss students’ probabilities to Basic, Proficient and Advanced levels of performance. The questions raised may include, “Are you as the educational professional satisfied with the probability that this student may reach the Proficient level or higher on a future PSSA? And, when combined with other data, does it confirm your knowledge of the student’s trajectory on a future PSSA?”
  - If yes, what needs to be done for this student to maintain the path to proficiency or higher?
  - If no, what needs to be done to change/increase this student’s trajectory to proficiency?

<table>
<thead>
<tr>
<th>Value</th>
<th>Interpretation</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than 70%</td>
<td>Scoring Proficient or above is likely.</td>
<td>Continue with student’s current program, investigate what has worked - the student is on a path towards scoring Proficient or above</td>
</tr>
<tr>
<td>Between 40% and 70%</td>
<td>Scoring Proficient or above may or may not occur.</td>
<td>Investigate and implement adjustments to student’s program to increase likelihood of scoring Proficient or above</td>
</tr>
<tr>
<td>Less than 40%</td>
<td>Scoring Proficient or above is unlikely.</td>
<td>Investigate and implement significant changes to student’s program to increase likelihood of scoring Proficient or above</td>
</tr>
</tbody>
</table>
EXAMPLES of Effective Use of PVAAS Student Projection Reports

- Using projections/probabilities to determine the trajectory of a student’s academic performance
- Using projections/probabilities with other data for data-informed decision making

NON-EXAMPLES of Use of PVAAS Student Projection Reports

- Comparing percentiles from the Student Projection Report to indicate growth
- Comparing NCEs from the Student Projection Report to indicate growth
- Drawing conclusions based on comparing Projection probabilities over multiple grades (years) to indicate growth
- Using projections/probability as the only source of data for decision making
**School Search**

Users can find and view the achievement and progress of public schools to which they have access and search for similar schools based on grade levels tested and various demographics.

The first table displayed on the top portion of the screen provides the selected school’s demographics, including the percentage of PSSA tested Economically Disadvantaged students, Minority (non-Caucasian) students, Limited English Proficient students, and Special Education students. The table also lists the tested grades served by the selected school and, for high schools the graduation rate.

The second table displayed on the bottom portion of the screen provides a list of schools to which you have access that meet your search criteria. This table includes for each school the Average Growth Index across PSSA tested grade levels served in the school, as well as achievement and growth information for each grade level tested and served in the school. Note: The achievement and growth information is based PSSA, PSSA-M and PASA.

**What do we need to know about these reports?**

- The Average Growth Index is a measure of student progress across the tested grade levels in a school. This index is a value based on the Growth Measure over grade levels and its relationship to the standard error so that comparison among schools is meaningful. PVAAS utilizes this index (based on the standard error) to allow for a view across schools. If the standard error is not accounted for, users might get a skewed picture of the relative effectiveness of different schools.

- For Math and Reading in grades 4 through 8, this index is a value based on the average growth across grade levels divided by its Standard Error, so that comparison among schools is meaningful. For Science, Writing, and Grade 11 Math and Reading, the Average Growth Index is the Growth Measure for the most recent year divided by its Standard Error so that comparison among schools is meaningful.

- If no quintile is listed for a particular school year, this indicates that too few students had sufficient longitudinal data to yield a reliable growth measure; a minimum of 10 students are needed to calculate a measure of growth at an overall grade level.

- For grades 4-8 in reading and math, all schools in the state were assigned to an achievement and a growth group (1 through 5) based on the rank of their estimated achievement and Growth Measure for a grade and subject. A “5” indicates that this school placed in the top quintile (i.e., top 20% of public schools) in the state based on the Growth Measure for that grade and subject. A “1” indicates that this school placed in the bottom quintile (i.e., bottom 20% of public schools) in the state based on the Growth Measure for that grade and subject.

- For science, writing and grades 9-11 math and reading, all schools in the state were assigned to an achievement and progress group (1 through 5) based on the rank of their current year Achievement and School Effect for the subject. A “5” indicates that this school placed in the top quintile (i.e., top 20% of public schools) in the state for the Growth Measure for that subject and grade level. A “1” indicates that this school placed in the bottom quintile (i.e., bottom 20% of public schools) in the state for the Growth Measure for that grade and subject.
Value-Added Frequently Asked Questions

1. Why is measuring both achievement and progress important?

2. How can value-added information help educators improve teaching and learning?

3. Is it possible to show progress with all groups of students, including students with IEPs, gifted students, high achieving and low-achieving students?

4. How can our percent of proficient and advanced students have increased last year in a grade level, but our PVAAS reports did not indicate a year of growth?

5. The value-added methodology seems complicated. How can people understand the measure?

6. Does value-added analysis require additional testing?

7. How can teachers be innovative or creative if student progress is based on test scores?

8. Do socioeconomic or other demographic factors of a school’s student population impact progress?

9. Can you measure the progress of schools/districts with high mobility rates?

10. Who provides PVAAS reporting for Pennsylvania?

11. How is PVAAS different from the assessment already in use in districts?

12. How is PVAAS different from other data tools being used in local districts?

13. PVAAS only gives information on rates of progress in reading, math, writing, and science. How is this useful to teachers in other content areas?

14. Is there a cost for the PVAAS analyses, reports, and training opportunities and resources?
Value-Added Frequently Asked Questions (FAQs)

#1: Why is measuring both achievement and progress important?
- Achievement measures provide educators with a snapshot of students’ performance at a single point in time and tell us how well those students perform against a standard for growth.
- Progress measures provide a more complete, and comprehensive picture of student growth from year-to-year, including how much growth, or gain, groups of students make over time.
- By measuring progress, all students count, regardless of their achievement level, rather than just those students near the cut for proficiency.
- By combining achievement and progress information, educators will have a more comprehensive picture of their impact on student learning.

#2: How can value-added information help educators improve teaching and learning?
- Provides important diagnostic information that was not previously available with traditional achievement reporting.
- Allows educators to assess their schools’ impact on student learning.
- Can help initiate conversations about the effectiveness of curriculum, instructional practices, and programs.
- Allows educators to better identify what is working well and areas for improvement to help individual students and groups of students.

#3: Is it possible to show progress with all groups of students, including students with IEPs, gifted students, high achieving and low-achieving students?
- Yes!
  - If assessments have enough “stretch” to measure the achievement of both low- and high-achieving students, it is possible to measure all groups of students’ progress. The PSSA meets the criteria!
  - The value-added methodology used is sensitive to individual students’ achievement levels.
  - It measures growth from the end of one year to the end of the next year, regardless of whether a student performs below, at, or above grade level.

#4: How can our percent of proficient and advanced students have increased last year in a grade level, but our PVAAS reports did not indicate a year of growth?
- There are two parts to this answer depending on the group of students you are following in regards to an increase in the percent of students performing at the proficient and advanced levels. First when following the same grade level from one year to the next, districts/schools may be looking at the performance of two different groups of students (i.e., 6th graders in 2010 are not the same group of students as 6th graders in 2011). As expected, different cohorts of students are different year to year in terms of their achievement. PVAAS is looking at the most recent group of students and evaluating their progress from where this group of students was the prior school year in the prior grade level. Specifically, PVAAS is looking at the academic progress of that group of students in the most recent year they were tested on the PSSA.
- Second you may in fact be following the same group of students from one grade level to the next. In this case, you may be seeing an increase in the percent of those same students performing at the proficient and advanced levels; however, in some cases you may be seeing a PVAAS report for those same students indicating evidence of the students not making a year’s growth (yellow, or red). This is possible even if the percent of proficient and advanced students is increasing (or even staying relatively stable). In this case, it is important to remember that PVAAS is not measuring progress by increasing in entire PSSA performance levels. Rather, PVAAS is more sensitive to progress even within those performance levels. You may find that the school has been successful in helping more students move from a non-proficient to a proficient/advanced level. However at the same time, students already proficient or advanced may be “slipping” in terms of their level of achievement compared to where they were the year prior, but still maintaining a proficient or advanced level overall. In other words, they may still be proficient or advanced, just not as high within those levels as they were in the prior year.
#5: The value-added methodology seems complicated. How can people understand the measure?
- While the statistical methodology used for value-added analysis is robust, the data produced are valid, reliable, and presented in readable charts and graphs.
- See additional explanations in this guide to explain the concepts behind value-added analyses.
- If we understand the information derived from the value-added reports, we can use it to make sound decisions about improving student achievement.
- Providing robust measures that yield quality information as compared to simple measures that are questionable in quality/accuracy makes the most sense for students.

#6: Does value-added analysis require additional testing?
- No new testing is required.
- Test data must meet the following criteria to be used for value-added analysis:
  - Be highly correlated with curricular objectives
  - Have enough “stretch” to measure the growth of both low- and high-achieving students
  - Meet appropriate standards of test reliability
  - The PSSA meets all of these criteria!
- The analysis uses existing standardized assessment data such as the PSSA to produce progress reports and can only be done where annual testing is provided (which is everywhere).

#7: How can teachers be innovative or creative if student progress is based on test scores?
- The value-added approach was developed to estimate each student’s academic growth over his/her school year in each subject and provide a report on the progress of a group of students.
- It does not suggest a particular method or instructional approach for encouraging this growth.
- Thus, teachers can and must be flexible, innovative, and evidence-based in their approaches to move all students toward higher levels of achievement.

#8: Do socioeconomic or other demographic factors of a school’s student population impact progress?
- Demographic variables have no significant relationship with student progress measures.
- Value-added analysis measures the change in students’ academic achievement levels from one point in time to another (i.e., year-to-year).
- Factors that remain relatively constant over time, such as socioeconomic status, have shown little or no impact on student progress.

#9: Can you measure the progress of schools/districts with high mobility rates?
- Yes!
  - Value-added analysis includes all students, for which there are sufficient test data, including highly-mobile students.
  - From a statistical perspective, it is important to include highly-mobile students in the analysis because their exclusion could bias the results.
  - From a philosophical perspective, all students must be included in the school’s analysis to ensure that highly-mobile students receive the same level of attention as non-mobile students.
  - The EVAAS modeling approaches take into account the quantity and quality of information available for each student.
- It is not enough to consider student achievement alone!
- Students’ progress must also be considered, so that students at every achievement level count.
- Ultimately, positive student growth will raise overall achievement for all student populations instead of placing focus on a specific proficient mark.
- The SAS team has been working for more than 20 years to develop a process that will enable a fair, objective measure of the impact of districts, schools and teachers on the rate of academic progress of populations of students utilizing student achievement test data.
#10: Who provides PVAAS reporting for Pennsylvania?
- The SAS EVAAS team has more than 20 years of experience of delivering value-added results in a production environment, and the statistical modeling behind EVAAS reporting has been publicly available for many years.
- The reliability of EVAAS reporting has been reviewed and confirmed by prominent experts.
  - US Government Accounting Office
  - Four US Department of Education Peer Review Committees
  - The RAND Corporation
- The rigor of the EVAAS value-added models protects students while more fairly informing the effectiveness of public districts and schools.

#11: How is PVAAS different from the assessment already in use in districts?
- PVAAS is the *analysis* of existing PSSA assessment data to produce measures of district and school effectiveness on the academic progress of groups of students. These measures of growth or progress are different from measures of achievement or proficiency. Growth, or progress, measures are different from measures of achievement or attainment/proficiency.

#12: How is PVAAS different from other data tools being used in local districts?
- PVAAS is a unique measure of the progress of groups of students. This measure is based on a robust statistical methodology. PVAAS reporting is complimentary to information yielded from other data tools, such as PSSA Data Interaction by eMetric, PAAYP, 4Sight benchmark assessments, and locally-used data systems and warehouses.

#13: PVAAS only gives information on rates of progress in reading, math, writing, and science. How is this useful to teachers in other content areas?
- Successful schools know that many of the concepts measured by reading and math assessments can and should be reinforced and applied in other content areas. Grade-level teams, subject-area teams, and other groups of teachers can work together to use their knowledge of effective curriculum, assessment, and instruction to take students to increased levels of growth in these areas.

#14: Is there a cost for the PVAAS analyses, reports, and training opportunities and resources?
- Data submission, analyses and Web-based reporting are being funded by the Pennsylvania Department of Education. In addition, school districts and IUs may obtain, free of charge, Pennsylvania Department of Education developed print resources, professional development training and materials.
Glossary of PVAAS Terms

- 3-Year Average Growth Measure
- Average Growth Index
- Growth Measure
- EVAAS
- Growth Measure over Grades
- Growth Measure over Grades Relative to Growth Standard
- Growth Measure over Grades Relative to State
- Average Predicted PSSA Score
- Average %-ile
- Average PSSA Score
- NCE
- Predicted Average %-ile
- PSSA
- PVAAS
- Quintiles
- Standard Error
- Statewide Distribution
Glossary

1. 3-Year Average Growth Measure
   - The 3-Year Average Growth Measure provides a robust estimate of how well the district or school impacts student progress. As a general guideline,
     - If the 3-Year Average Growth Measure is greater than 0, the average student in this grade level in this district or school has met the standard for PA Academic Growth.
     - If the 3-Year Average Growth Measure is less than 0, the average student in this grade level in this district or school has not met the standard for PA Academic Growth.
   - What question does this answer? In lay terms, what has been the average growth experience for students at this grade level?
   - Where can I find this? District/School Value-Added Report (Grades 4-8, Reading and Math)

2. Average Growth Index
   - The Average Growth Index is a measure of student progress for the selected test and subject. For Math and Reading in grades 4 through 8, this index is a value based on the average growth across grade levels divided by its Standard Error, so that comparison among schools is meaningful. For Science, Writing, and Grade 11 Math and Reading, the Average Growth Index is the Growth Measure for the most recent year divided by its Standard Error so that comparison among schools is meaningful.
   - What question does this answer? In lay terms, how does the progress of students in this school compare to the progress of students in other schools who were tested in the same subject?
   - Where can I find this? School Search

3. Growth Measure
   - Grades 4-8, Reading and Math
     - Reading and Math is tested in consecutive grades in grades 4-8. The Growth Measure in grades 4-8 for reading and math represents the minimum amount of progress schools should expect a group of students to make from grade to grade in consecutive school years.
     - The Growth Standard is based on the 2006 PSSA statewide distributions of scale scores; hence this is NOT a moving target.
     - The Growth Measure, displayed for each grade, indicates how much movement a group of students has made on the NCE scale (that ranges from approximately 1 to 100) as compared to the previous year (all prior data is used to estimate previous year and current year’s performance). The Growth Measure is the approximation of the difference between the Estimated District/LEA (or School) NCE Score from the most recent year (2010 for example) and the previous year (2009 for example). However the estimation is based on all longitudinal data, not just two scores.
     - The Growth Measure provides educators with a measure of progress students have made in that grade level during the previous school year. The Growth Measure is reported in NCE (Normal Curve Equivalence) points. NCEs are used to place test scores on a common scale so that academic growth can be measured across time and different subjects and grades.
     - For example, a Growth Measure of -2.7 indicates that the group of students declined in their achievement position by about 2.7 NCE points from one grade level to the next. Similarly, a Growth Measure of 5.9 indicates that the group of students improved their achievement position by approximately 5.9 NCE points from one grade level to the next.
   - Grades 9-11, Reading and Math; Science and Writing
     - For Science, Writing, and Grade 11 Reading and Math, students are not tested in consecutive years. The growth measure in these subject areas and grade levels is based on the Predictive Methodology and is reported in terms of District/School Effect. The Growth Measure is a conservative estimate of a district or school’s influence on students’ academic progress. The
Growth Measure is a function of the difference between the students' observed scores (Avg. PSSA Score) and their predicted scores (Average Predicted PSSA Score). If students score as expected (i.e., students' observed scores are equal to their predicted scores), the estimated District/School Effect would be 0, indicating progress similar to the average district/school in the state. In other words, the Growth Measure is the amount of progress made by that group of students.

- It is a measure of the growth that the students tested in grade 11 have made over the past 3 years since being tested in grade 8.
  - What question does this answer? In lay terms, how effective was the district/LEA/school in promoting student academic growth and supporting students to meet or exceed their expected progress?
  - Where can I find this? District/School Value-Added Reports

4. **EVAAS**
   - EVAAS stands for Educational Value-Added Assessment System.
   - EVAAS is the statistical methodology used for value-added reporting in Pennsylvania.
   - The EVAAS methodology is based on a mixed model multivariate longitudinal analyses of assessment data. In Pennsylvania, it is an analysis of the Pennsylvania System of School Assessment (PSSA).

**Growth Measure over Grades**

- The Growth Measure over Grades measures the average progress of a district or school’s students in grades for which gains are available. This value represents the average gain across the grades reported in PVAAS for that district or school compared to either the Growth Standard or to the State 3-Year Average for those same grade levels.
  - What question does this answer? In lay terms, how much did the district/LEA/school impact the average academic progress of students across the grade levels served in the district/LEA or school?
  - Where can I find this? District/School Value-Added Report (Grades 4-8, Reading and Math)

5. **Growth Measure over Grades Relative to Growth Standard**
   - The Growth Measure over Grades in general measures the average progress of a district or school’s students in grades for which a Growth Measure is available. The Growth Measure over Grades Relative to the Growth Standard represents the average growth across the reported grades for that district or school compared to the Growth Standard.
   - The Growth Measure over Grades Relative to the Growth Standard is the average of all growth in the chosen subject for that year across all reported grade levels. In other words, for a middle school serving grades 6-8, the Growth Measure over Grades Relative to the Growth Standard would be the average of the 6th grade gain, 7th grade gain, and 8th grade gain.
   - What question does this answer? In lay terms, how effective was the district, LEA, or school in impacting the academic progress of its students compared to the Growth Standard?
   - Where can I find this? District/School Value-Added Report (Grades 4-8, Reading and Math)

6. **Growth Measure over Grades Relative to the State**
   - The Growth Measure over Grades Relative to the State represents the average growth across the grade levels served between 4 and 8 compared to the average progress of all students in Pennsylvania at the same grade levels. In other words, it is the average academic growth of student district’s or school’s students, compared to the academic growth of students statewide.
   - The Growth Measure over Grades Relative to the State is a similar calculation to the Growth Measure over Grades Relative to the Growth Standard. However this value takes into account the difference between the growth for a year/grade level and the State 3-Year Average for that grade level.
   - What question does this answer? In lay terms, how much did YOUR district/school impact the academic progress of students across grade levels compared to the progress of other students in Pennsylvania in those same grade levels?
   - Where can I find this? District/School Value-Added Report (Grades 4-8, Reading and Math)
7. **Average Predicted PSSA Score**
   - The Average Predicted PSSA Score displays the average predicted PSSA scaled score of all students tested within the grade level and subject area and who have at least 3 prior data points in Math and/or Reading (or 2 data points in the case of Grade 4 Science).
   - What question does this answer? In lay terms, what SHOULD we have expected this group of students to score on the most recent assessment, given their prior history?
   - Where can I find this? District/School Value-Added Report (Grade 11, Reading and Math; Science, all grades tested; and Writing, all grades tested)

8. **Average %-ile**
   - The Average %-ile displays where the Average PSSA Score falls in the distribution of scores that includes all students’ observed (actual) scores in Pennsylvania.
   - What question does this answer? In lay terms, how well did students actually perform compared to other students in Pennsylvania in the same grade level and subject area?
   - Where can I find this? District/School Value-Added Report (Grade 11, Reading and Math; Science, all grades tested; and Writing, all grades tested)

9. **Average PSSA Score**
   - The Average PSSA Score displays the average observed (actual) PSSA scaled score of all students tested within the grade level and subject area selected who have at least 3 prior data points in Math and/or Reading (or 2 data points in the case of Grade 4 Science).
   - What question does this answer? In lay terms, how did this group of students perform on the most recent assessment?
   - Where can I find this? District/School Value-Added Report (Grade 11, Reading and Math; Science, all grades tested; and Writing, all grades tested)

10. **NCE**
    - NCE stands for Normal Curve Equivalent. The NCE is simply a rescaled score for which a chosen reference distribution is rescaled so that the mean is always 50, the standard deviation is 21.06, and the scores follow a normal distribution. In Pennsylvania, the reference distribution is the statewide distribution of PSSA scaled scores in 2006. PSSA scaled scores are converted to NCE scores prior to the PVAAS analyses.
    - What question does this answer? In lay terms, how did this group of students perform on the most recent assessment?
    - Where can I find this? District/School Value-Added Report (Grades 4-8, Reading and Math)

    - Due to rescaling, NCE scores have an equal-interval relationship so averages and differences of test scores remain meaningful. This allows Mean NCE Gains to be comparable for all schools no matter what the average achievement level is for that school.
    - NCE scores are about rescaling so that scores can be compared from grade level to grade level and from year to year. It is like putting the scores into a common language so they can talk to each other – in order to yield a measure of growth on a group of students.
    - The shape of the distributions of scaled scores in each year is irrelevant in the application of NCE scores that are used in the PVAAS analyses.
    - There is no relationship between Normal Curve Equivalents and norm-referenced tests. The intent is to put the scores on a common scale for comparison.
    - Where can I find this? District/School Value-Added Report (Grades 4-8, Reading and Math)
11. **Predicted Average %-ile**
   - The Predicted Average %-ile (percentile) displays where the Average Predicted PSSA Score falls in the distribution of scores that includes all students' observed (actual) scores in Pennsylvania.
   - **What question does this answer?** In lay terms, how well was this group of students predicted to perform compared to other students in Pennsylvania in the same grade level and subject area?
   - **Where can I find this?** District/School Value-Added Report (Grade 11 Reading and Math; Science, all grades tested; and Writing, all grades tested)

12. **PSSA**
   - PSSA stands for the Pennsylvania System of School Assessment.
   - The annual Pennsylvania System of School Assessment (PSSA) is a standards-based, criterion-referenced assessment used to measure a student's attainment of the academic standards while also determining the degree to which school programs enable students to attain proficiency of the standards.
   - Each school year, every Pennsylvania student:
     - in grades 3 through 8 and grade 11 is assessed in Reading and Math;
     - in grades 5, 8 and 11 is assessed in Writing; and
     - in grades 4, 8 and 11 is assessed in Science.

13. **PVAAS**
   - PVAAS is the Pennsylvania Value-Added Assessment System.
   - PVAAS is Pennsylvania’s approach for providing value-added reporting to local education agencies.
   - The PVAAS methodology is based the EVAAS methodology which is a mixed model multivariate longitudinal analyses of assessment data. In PVAAS, it is an analysis of the Pennsylvania System of School Assessment (PSSA).

14. **Quintiles**
   - By definition, a quintile is a statistical value from 1 through 5 that represents 20% of a given population. The first quintile represents the lowest fifth of the data (1-20%); the second quintile represents the second fifth (21% - 40%); and so on.
   - In PVAAS reporting, quintiles are used to indicate where a particular school falls in regards to achievement and/or progress compared to all other schools in Pennsylvania serving the same corresponding grade level. A quintile of “1” indicates the school falls in the bottom 20% of all schools in Pennsylvania, while a quintile of “5” indicates the school falls in the top 20% of all schools in Pennsylvania.
   - **Achievement Quintile – Grades 4-8, Reading & Math**
     All schools with Means (achievement means) for the most recent school year are assigned to an achievement quintile, according to their rank of their Observed Mean NCE (Normal Curve Equivalent) Score for a particular grade and subject. A “1” in the Achievement column indicates the lowest achievement quintile (bottom 20% of the state) and a “5” in the Achievement column indicates the highest achievement quintile (top 20% of the state). Note that this is different from the percent of students who are Proficient or Advanced.
   - **Growth Quintile – Grades 4-8, Reading & Math**
     All schools in the state were assigned to a progress group (1 through 5) based on the position of their estimated Mean NCE Gain for a grade and subject. A “5” in this column indicates that this school placed in the top quintile (i.e., top 20%) in the state based on Mean Gain for that grade and subject. A “1” in this column indicates that this school placed in the bottom quintile (i.e., bottom 20%) in the state based on Mean Gain for that grade and subject. If no quintile is listed for a particular school year, this indicates that too few students had sufficient longitudinal data to yield a reliable growth measure; a minimum of 10 students are needed to calculate a measure of growth at an overall grade level.
   - **Achievement Quintile – Grade 11, Reading and Math; Science; and Writing**
All schools in the state were assigned to an achievement quintile, according to the rank of their Observed Mean Score for a particular grade and subject. A “1” in the Mean column indicates the lowest achievement quintile (bottom 20% of the state) and a “5” in the Mean column indicates the highest achievement quintile (top 20% of the state). Note that this is different from the percent of students who are Proficient or Advanced.

- **Growth Quintile – Grade 11, Reading and Math; Science; and Writing**
  All schools in the state were assigned to a progress group (1 through 5) based on the position of their current year School Effect for the subject. A “5” in this column indicates that this school placed in the top quintile (i.e., top 20%) in the state for School Effect for that subject and grade level. A “1” in this column indicates that this school placed in the bottom quintile (i.e., bottom 20%) in the state for School Effect for that grade and subject. If no quintile is listed for a particular school year, this indicates that too few students had sufficient longitudinal data to yield a reliable growth measure; a minimum of 10 students are needed to calculate a measure of growth at an overall grade level.

- **What question does this answer?**
  - **Achievement Quintile**: How does the observed achievement of this school's students compare to that of other schools, across the state?
  - **Growth Quintile**: In lay terms, how well did YOUR school impact achievement and growth for its students in the indicated grade level compared to other schools in Pennsylvania serving the same grade level?

- **Where can I find this?** School Search

### 15. Standard Error

- Growth values reported on the PVAAS reports are estimates of progress for groups of students. There is natural error involved with any estimate, and this error is expressed in terms of the Standard Error. On the Value-Added Report, the Standard Error allows users to establish a confidence band around the Estimated Mean NCE Gain or the District/School Effect to determine if progress is evident for the group of students in question. The inclusion of more data (i.e., more students, more data points) generally yields a smaller Standard Error and makes the Estimated Mean NCE Gain or District/School Effect more precise. One of the major functions of the Standard Error is that it allows us to evaluate the significance or level of evidence that the estimate provides.

- The Standard Error is used in determining the color coding given to each Estimated Mean NCE Gain and District/School Effect.

- **Where can I find this?** District/School Value-Added Report (Grades 4-8, Reading and Math) and District/School Value-Added Report (Grade 11 Reading and Math; Science, all grades tested; and Writing, all grades tested)

### 16. Statewide Distribution

- Each school year, every Pennsylvania student in grades 3 through 8 and 11 is assessed using the Pennsylvania System of School Assessment (PSSA). The PSSA is a standards-based, criterion-referenced assessment used to measure a student's attainment of the academic standards while also determining the degree to which school programs enable students to attain proficiency of the standards.

- A statewide distribution is produced each year detailing the arrangement of scores and their frequency of occurrence.