

THE LITERACY PROFICIENCIES OF THE WORKING-AGE RESIDENTS OF PHILADELPHIA CITY

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Table of Contents

Executive Summary	i
Introduction.....	1
The NAAL Literacy Areas and Levels of Literacy Proficiency.....	4
The Literacy Proficiencies of the Nation’s Working-Age Population and the Demographic Composition of the Population of Pennsylvania, and Philadelphia	6
Literacy Proficiencies of the Total Working Age Population, US: 2003	6
Literacy Proficiencies by Gender and Age, U.S. 2003	7
The Gender and Age Composition of the Working Age Population in Philadelphia City, Suburban Philadelphia, Pennsylvania, and the U.S., 2005	9
Literacy Proficiencies by Race-Ethnicity and Nativity Status, US: 2003	10
The Race-Ethnicity and Nativity Characteristics of the Working Age Population in Philadelphia City, Suburban Philadelphia, Pennsylvania, and the U.S., 2005	14
Literacy Proficiencies by Educational Attainment, US: 2003	15
The Educational Attainment of the Working Age Population in Philadelphia City, Suburban Philadelphia, Pennsylvania, and the U.S., 2005	19
Literacy Proficiencies by Labor Force Status, US: 2003.....	20
The Labor Force Status of the Working Age Population in Philadelphia City, Suburban Philadelphia, Pennsylvania, and the U.S., 2005	23
Simulation of the Literacy Proficiencies of the Residents of Philadelphia City, Suburban areas of Metropolitan Philadelphia, and Pennsylvania	25
The Simulation Methodology	25
Simulated Literacy Scores	30
Simulated Literacy Levels	33
Appendix Table A1	38

Executive Summary

This paper presents findings about the literacy proficiencies of the working age resident population of the city of Philadelphia during 2005 and presents projections of the likely trends in literacy skills of the city residents given expected changes in the size and composition of the city's population through 2030. This study relies on measures of literacy in the adult population of the nation from the 2003 National Assessment of Adult Literacy (NAAL) that was sponsored by the U.S. Department of Education's National Center for Education Statistics. The NAAL data we employed is based on a representative sample of the nation's population who participated in a series of measures of prose, document and quantitative literacy. Prose literacy refers simply to reading comprehension. Document literacy refers skills used to interpret various kinds of documents used in every day life including forms like pay stubs, reading a map or a timetable. Quantitative skills refer to math skills like using numeric information or making a set of calculations that might use fractions and decimals.

We produced estimates of the current literacy proficiencies of the Philadelphia working age population by using the findings from the national NAAL study and applying the literacy scores for 32 demographic subgroups nationally to the Philadelphia population during 2005. The characteristics of the city's population were estimated using data from the American Community Survey. A more detailed discussion of our method is provided in the body of the text.

The findings in this report paint a picture of a city with an adult population that has relative low literacy proficiencies. We found that:

- Working age adults in Philadelphia had mean prose scores of 260 compared to scores of 281 in the surrounding suburban areas and 280 for the state of Pennsylvania as a whole. This score is about one third of standard deviation below that found for the suburban area and the state. A difference of this magnitude is considered to be a large one with important implications for access to further education and to jobs. About one in five adults in Philadelphia had prose literacy scores that are considered Below Basic. In contrast only about one

- tenth of the suburban and statewide adult population had scores in the below basic level.
- The document proficiencies of Philadelphia residents were also well below those of their suburban and statewide counterparts. Working age adults in Philadelphia had estimated mean document skill scores of 255 compared to 275 in the suburbs and 274 statewide. Again, the scores for Philadelphia residents were about one third of a standard deviation below those of their suburban and statewide counterparts.
 - The quantitative skills of the adult resident population of Philadelphia were quite low. Suburban and statewide scores were 289 and 288 respectively on the quantitative measure. However, the mean score estimated for Philadelphia was just 263, a score that was .43 standard deviations below the suburban and statewide scores. The result is that we found that about one third of the city's working age population had quantitative skills that were classified as Below Basic. Nearly double the share of very low scores found in the adult populations in both the suburbs and the state as a whole.
 - Projections of future population growth for the city suggest a slow but continued long term decline in the prose, document and quantitative skills of the adult residents of the city through 2030. Between 2005 and 2030 we expect that the prose score of the working age population in Philadelphia will fall from a mean of 260 to 253, mean document scores will decline from 255 to 248 and mean quantitative scores will fall from 263 to 257. Most of this decline will be concentrated in growth in the number of adults with proficiency levels at the Below Basic levels, especially in the quantitative areas.
 - Low literacy skills can act as a brake on economic prosperity in the city. Economic growth is heavily dependent on the skills and abilities of the resident workforce of an area. Low literacy skills suggest diminished economic opportunity for city residents with increased reliance on suburban communities for labor supply. It also suggests that economic growth will occur in other cities and regions of the nation with a resident population with stronger literacy skills and all of the gains in labor market outcomes associated with those skills.

- In a subsequent report we will examine more closely the labor market implications of low literacy skills including their implications for access to employment in key occupations in the Philadelphia region

Introduction

The literacy proficiencies of the nation's population and especially the nation's workforce receives increased attention when employers have difficulties in finding qualified individuals to fill job vacancies. More attention is paid to these kinds of basic skills shortages during economic expansions when unemployment is low and many sectors of the economy experience worker shortages. The full employment condition that characterized the labor markets during the late-1990s is a case in point. Employers at that time were clamoring for skilled workers and labor shortages were at the forefront of any discussion of the economic problems facing the nation. While short-run labor market conditions often dominate workforce development policy the skills of the workforce are important beyond the temporary shortages that arise when the economy is expanding rapidly. Indeed, the quality of labor supply is a critical determinant of the economic prosperity of an area.¹

As the job content of the U.S. economy has moved away from blue-collar production jobs to high skill service sector jobs, the work environment has become increasingly sophisticated with rising demands for handling complex service delivery with professional competence. The result unsurprisingly has been that the literacy requirements of the workplace have increased sharply since the mid 1970s. The higher literacy requirements are not simply restricted to the workplace. Increasingly complex means of communication and the growth in the information that most people are expected to access, sort, integrate, and understand has sharply increased the literacy requirements for effective civic engagement and for participation in institutions that deal with tax and finances, healthcare, and other public services.²

Literacy represents more than just the three R's. It is more than a mere description of the skill levels and abilities of individuals. Rather, the literacy proficiencies of the population are a key determinant of the quality of the workforce and are found to have a

¹ i) Philadelphia Workforce Investment Board, *A Tale of Two Cities*, Fall, 2006

ii) Neeta P. Fogg and Paul E. Harrington, *The Education Deficit in Philadelphia Opportunities to Expand Labor Supply, Reduce Unemployment, and Increase Earnings Through Investment in Education*, Center for Labor Market Studies, December, 2005

² Economists do not limit their assessment of the gains to human capital to the labor market alone. See Gary Becker and Guity Nashit Becker, *The Economics of Life*, McGraw Hill, New York, 1997

close positive association with economic growth and living standards. Across the board, the growing literacy requirements for effective participation in today's economy and society has led to limitations in the opportunities of individuals with lower literacy levels to participate in the economic, social, political and civic arenas. Low levels of literacy are consistently associated with limited employment opportunities and increased economic hardships.³ As the economy marches along towards the application of more sophisticated technologies in production and more complex occupational skill requirements, increasing numbers of individuals will be expected to increase their literacy levels and attain advanced skills or risk being left behind. The demand for higher literacy and skill levels and its economic rewards are expected to increase in the future resulting in the widening of the gap between the economic fortunes of the less literate population and their counterparts with higher levels of literacy and skills.⁴ The consequences of all these changes have increasingly made literacy a fault line between the economic haves and the have nots.

The rising demand for increasingly advanced skills in the workforce has led to two major national assessments of adult literacy to date. In 1992, the National Adult Literacy Survey (NALS) was designed to measure literacy of adults based on a nationally representative sample of about 26,000 adults ages 16 and over. More recently, a successor to the NALS called the National Assessment of Adult Literacy or NAAL was conducted in 2003. The NAAL and the NALS examined English language literacy among residents of the United States who were 16 years or older. The NALS and the NAAL were designed to assess functional literacy using a task-based definition of literacy. The assessment focused on everyday tasks that American adults encounter at work, at home, and in their communities. The NAAL assessment defines literacy as, "using printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential."⁵

³ Andrew Sum, *Literacy and the Labor Force*, National Center for Education Statistics, Washington DC, 1993.

⁴ Andrew Sum, *Projected Literacy Proficiencies of the Working Age Population of the U.S. Through 2030*, Center for Labor Market Studies, Northeastern University, Boston, March 2006.

⁵ Mark Kutner, Elizabeth Greenberg, and Justin Baer, *A First Look at the Literacy of America's Adults in the 21st Century*, U.S. Department of Education, Institute of Education Sciences, National Center for Educational Statistics, 2006.

The 2003 NAAL results are based on a nationally representative sample of 19,300 adults ages 16 and older which includes 5,700 adults from the six states that chose to participate in the state assessments of literacy and 1,200 inmates from federal and state prisons. In this report, we present findings from our analysis of the NAAL 2003 data on the literacy proficiencies of the nation's population. A number of states participated in the NAAL state assessment program. Unfortunately, Pennsylvania did not participate in the NAAL state assessment program. Consequently, the NAAL literacy scores cannot be produced at the state level for Pennsylvania or any of the sub-state areas like the Philadelphia metropolitan area or Philadelphia city. In the absence of direct estimates of the literacy characteristics of the city and state population we have used data on selected demographic traits of the state and local population along with the NAAL findings for these selected demographic groups from the national sample to produce a set of synthetic estimates of the literacy traits of the city, suburb and state wide working age population.

This method utilized population data from the city, the suburbs and that state that is derived from the 2005 American Community Survey (ACS). The ACS is a large scale survey of households conducted by the U.S. Bureau of the Census on annual basis. The ACS sample sizes are quite large, even at the local level, and thus are capable of producing highly accurate population, labor force and related estimates at both the state and local level. During 2005, about 7,400 households provided usable responses to the ACS in Philadelphia city, providing researchers with a very large sample upon which to develop analysis. Using the ACS public use data files for 2005, CLMS was able to produce population estimates for the same demographic subgroups that were made available to us from the NAAL literacy study. We utilized NAAL literacy scores for each population subgroup along with ACS population estimates to produce a set of simulated literacy proficiencies of the working age population in Philadelphia, the surrounding suburban area and the state of Pennsylvania.

This report contains an assessment of the literacy proficiencies of the population in Philadelphia city, suburban Philadelphia, and Pennsylvania. It begins with a description of the three NAAL literacy areas—prose, quantitative, and document—and a review of the skill descriptions that NCES has used to characterize the literacy proficiency levels of the population. The next section contains analyses of the literacy

proficiencies of the nation's adult population and the differences in the literacy proficiencies across demographic subgroups of the nation's population. Our analysis focuses on six subgroups of the population including gender, age, race-ethnicity, nativity status, educational attainment, and labor force status. In addition to the mean scores in each of the literacy areas—prose, quantitative, and document, we will also present the distribution of the population by levels of literacy proficiencies. Following the analysis of the mean literacy scores and literacy levels of different subgroups of the population, the demographic composition of the population of Pennsylvania, suburban Philadelphia and Philadelphia city is presented from the 2005 ACS data. Broad inferences about the literacy proficiencies of the adult populations in these areas are drawn from the demographic composition of the population in these areas and the literacy proficiencies of these demographic subgroups at the national level. In the final section, we have presented findings from our simulations of the literacy scores and literacy levels among the adult populations of Pennsylvania, suburban Philadelphia, and Philadelphia city.

The NAAL Literacy Areas and Levels of Literacy Proficiency

The 2003 NAAL assessment was conducted in three literacy areas: prose, document, and quantitative. Prose literacy is a measure of the skill in using information presented in textual format such as editorials, news stories, brochures, and instructional materials. It refers to the knowledge and skills needed to perform prose tasks such as: to search, comprehend, and use continuous texts. Document literacy reflects the skill in using information presented in graphs, figures, or tables. It refers to the knowledge and skills needed to perform document tasks such as to search, comprehend, and use non-continuous texts in various formats. Document examples include job applications, payroll forms, transportation schedules, maps, tables, and drug or food labels. Quantitative literacy is a measure of the skill in using and performing arithmetic operations on numbers presented in text or in documents. It refers to the knowledge and skills required to perform quantitative tasks such as to identify and perform computations, either alone or sequentially, using numbers embedded in printed materials. Examples include balancing a checkbook, computing a tip, completing an order form, or determining the amount of interest on a loan form an advertisement.

Results from the NAAL literacy assessment are available in the form of average or mean scores in each of the three literacy scales. The literacy scores for each scale are based on a scale of 0 to 500. The results from the NAAL literacy assessment are also available as the percentage distribution of adults across the four literacy performance levels: Below Basic, Basic, Intermediate, and Advanced. The scores associated with the four literacy performance levels for the prose, document, and quantitative scales and a brief description and examples of tasks associated with these levels are presented in Table 1.

Table 1:
The Literacy Score Thresholds and Tasks Associated
with the Four Performance Levels

	Prose	Document	Quantitative
Below Basic	0-209	0-204	0-234
Basic	210-264	205-249	235-289
Intermediate	265-339	250-334	290-349
Advanced	340+	335+	350+

The lowest performance level is characterized by scores between 0 and 209 on the prose scale, 0 and 204 on the document scale, and 0 and 234 on the quantitative scale. The upper boundary score of the second literacy performance level, labeled as the Basic level, is 264, 249, and 289 on the prose, document, and quantitative scales, respectively. In order to be classified into the second highest level, Intermediate level, the literacy scores had to be between 265 and 239 on the prose scale, 250 and 334 on the document scale, and 290 and 349 on the quantitative scale. In order to be classified in the Advanced performance level, individuals had to earn a score above 339 on the prose scale, above 334 on the document scale, and above 349 on the quantitative scale. Examples of the skills that characterize each of these skill levels for the three literacy domains are provided in Table A1 in an Appendix to this report.

The Literacy Proficiencies of the Nation’s Working-Age Population and the Demographic Composition of the Population of Pennsylvania, and Philadelphia

Literacy Proficiencies of the Total Working Age Population, US: 2003

The literacy proficiencies of the nation’s adult population are presented in Table 2 in the form of mean skill scores in each area and a distribution of the nation’s adult population across the four literacy levels. The NAAL 2003 literacy scores are computed on a scale of 0 to 500. The average score of the nation’s population was 275 on the prose scale, 271 on the document scale, and 283 on the quantitative scale. The standard deviations of each of these three scores imply that there was a considerable amount of dispersion around these mean scores. The standard deviation is a statistic that indicates how tightly all the values in the distribution are clustered around the mean. One standard deviation away from the mean accounts for approximately 68 percent or two-thirds of the distribution. Two standard deviations account for roughly 96 percent of the people.

The standard deviation of the nation’s literacy scores was 59 points on the prose scale, 57 points on document scale, and 61 points on the quantitative scale. This means that the literacy scores of about two-thirds of the nation’s working-age population were between 216 points and 334 points on the prose scale—mean score (275) \pm standard deviation (59), between 214 and 328 on the document scale—mean score (271) \pm standard deviation (57) and between 222 and 344 on the quantitative scale—mean score (283) \pm standard deviation (61).

Table 2:
Average Prose, Document, and Quantitative Literacy Scores of All Adults (16 years of Age and Older), U.S. 2003

	Prose	Document	Quantitative
All	275	271	283
Standard Deviation	59	57	61
Percentage Distribution by Level			
Below Basic	13.6%	12.4%	21.5%
Basic	28.8%	22.4%	32.7%
Intermediate	42.4%	52.6%	32.5%
Advanced	15.3%	12.6%	13.4%

The performance levels of the nation’s adult population varied considerably across the three literacy areas. Nearly 14 percent of the nation’s adults performed at the Below Basic level on the prose scale compared to 12 percent on the document scale and nearly 22 percent on the quantitative scale. More than one-half of the adult population scored at the Below Basic or Basic level on the quantitative scale—representing 12 percentage points higher than the Below Basic and Basic shares (42 percent) on the prose scale and nearly 20 percentage points higher than the 35 percent of adults who performed at the Below Basic or Basic level on the document scale. The prose and document scales had higher shares of scores at the Intermediate level than the quantitative scales and all three scales had similar shares of adults scoring at the Advanced level.

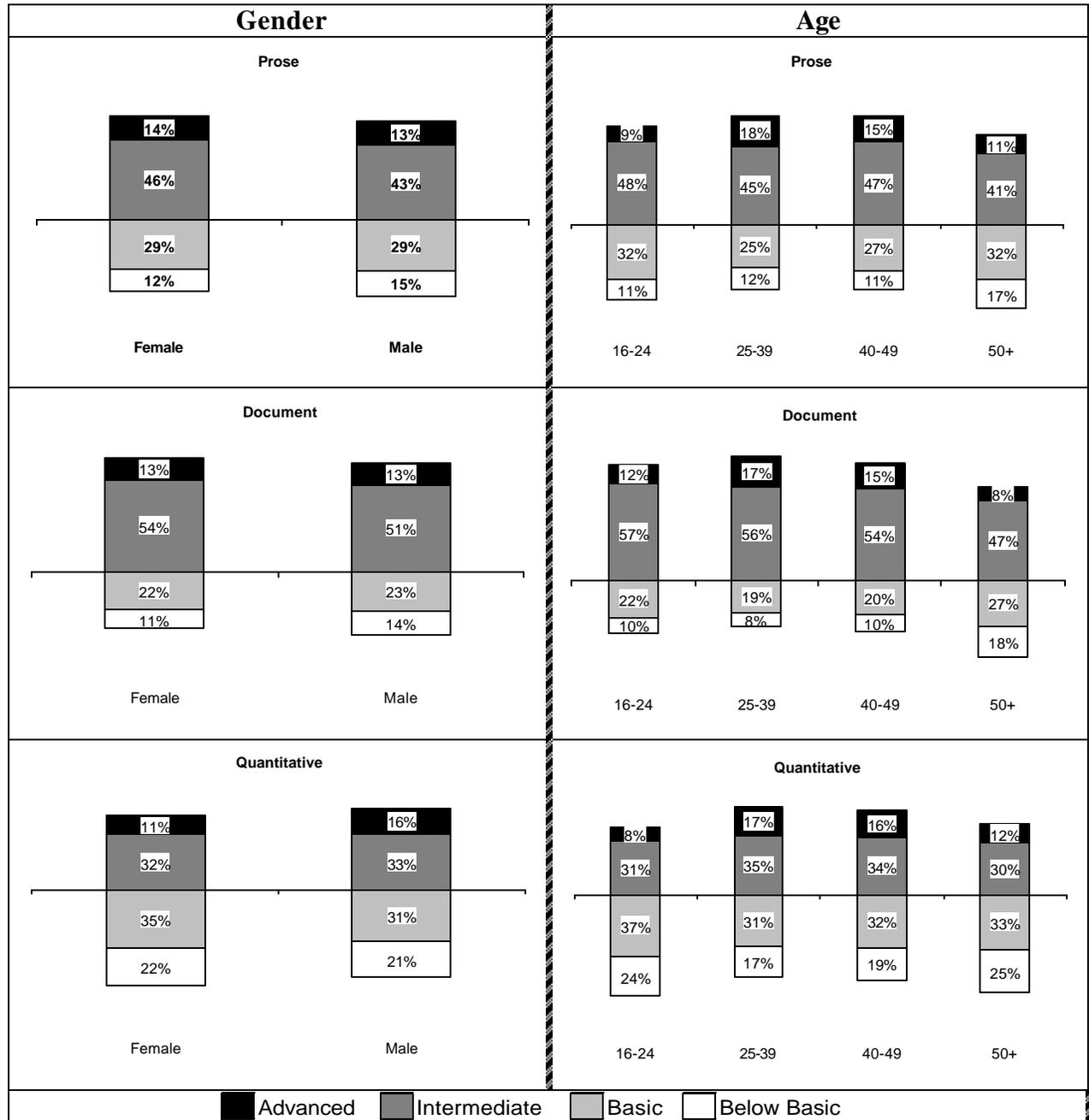
Literacy Proficiencies by Gender and Age, U.S. 2003

A comparison of the mean literacy scores of the nation’s working-age population from the 2003 NAAL reveals sharp variations in the literacy proficiencies across different subgroups of the population. The mean scores of women were higher than that of men on the prose and document literacy scales, but the quantitative literacy score of women was lower than that of men. A comparison of the NAAL literacy scores by age group reveals that on each of the three literacy scales, the mean scores were the highest among the 25 to 39 age group. On the prose and document scale the 50 plus population had the lowest mean scores and on the quantitative scale the nation’s 50-plus group and the 16-24 year old group had the lowest mean literacy scores.

Table 3:
Average Prose, Document, and Quantitative Literacy Scores of Adults (16 years of Age and Older) by Gender and Age, U.S. 2003

	Prose	Document	Quantitative
<u>Gender</u>			
Male	272.5	268.8	286.6
Female	277.3	272.4	279.5
<u>Age</u>			
16-24	272.6	274.1	274.9
25-39	283.5	282.8	292.2
40-49	282.3	277.6	289.1
50 years or older	265.5	255.7	275.8

Chart 1:
Percentage Distribution of the Adult (16 years or older) Population by the Level of their
Prose, Document, and Quantitative Literacy Scores, by Gender and Selected Age
Subgroups, U.S.: 2003



An examination of the distribution of the nation's adult population by the four levels of literacy reveals that, in the prose and document literacy areas the share of scores among the two sexes were the same at the Advanced level and the Basic level, higher among women at the Intermediate level, and lower among women at the Below basic level. A higher share of women scored in the top two levels in these two literacy areas.

On the quantitative scale, men performed at higher levels than women. One out of six secured a score on the quantitative scale that placed them at the Advanced level compared to one in nine women who secured a score above that score threshold. The Advanced level represents the highest level of quantitative proficiencies. Overall, the performance of men and women on the quantitative scale placed 43 percent of females and 49 percent of males in the top two levels and the 57 percent of females and 51 percent of males in the two bottom proficiency levels.

The Gender and Age Composition of the Working Age Population in Philadelphia City, Suburban Philadelphia, Pennsylvania, and the U.S., 2005

As noted above, Pennsylvania did not participate in the state literacy assessment component of the 2003 NAAL. As a result we are not able to directly determine the literacy proficiencies of the population of Pennsylvania or Philadelphia. Instead we analyzed the differences in the demographic composition of the working-age population of different areas to make reasonable inferences about the literacy proficiencies of the residents of a given area based upon whether the area had a higher or a lower concentration of demographic subgroups that have higher or lower literacy scores on the nationwide NAAL.

The 2005 gender and age composition of the 16+ population of Philadelphia city, suburban Philadelphia, and Pennsylvania as well as the nation are presented in Table 4. Philadelphia differed from both the nation and the state in that its working age population was more heavily female and somewhat younger than the other areas. Philadelphia city had a higher share of females in the adult population than the suburbs, the entire state, and the nation. Indeed the ACS found 122 females per 100 males in the 16+ population in the city- a large disparity in the gender composition of the working age population. This finding when assessed in the context of the NAAL score suggests that the overall

quantitative scores for the 16+ population in the city may be somewhat lower than that of the nation given the higher share of female residents in the city.

Table 4:
The Percentage Distribution of the 16+ Population by Gender and Age, 2005

<u>Race-Ethnicity</u>	Philadelphia City	Philadelphia Suburbs	Pennsylvania	U.S.
<u>Total</u>	100.0%	100.0%	100.0%	100.0%
<u>Gender</u>				
Male	45.0%	48.3%	47.6%	48.4%
Female	55.0%	51.7%	52.4%	51.6%
<u>Age</u>				
16-24	16.6%	13.7%	14.2%	15.5%
25-39	26.7%	23.0%	23.4%	26.6%
40-49	19.0%	22.2%	20.2%	20.1%
50+	37.7%	41.0%	42.2%	37.9%

The city’s share of the very young population, 16-24 years old, was also higher than the rest of the state and the nation. Compared to the rest of the state of Pennsylvania, Philadelphia city had a younger population—higher shares of 16-24 year olds and 25-39 year olds and lower shares of those who are 40 years or older. The age distribution of the population of the city was more similar to that of the nation than the state of Pennsylvania. Philadelphia city had slightly larger shares of those age subgroups that had higher mean literacy scores on the national NAAL assessment.

Literacy Proficiencies by Race-Ethnicity and Nativity Status, US: 2003

The literacy scores of the nation’s adult population varied widely across race-ethnicity groups. The mean literacy scores of Hispanics and African-Americans were considerably lower than that of their White counterparts in each of the three literacy areas (Table 5). The White-Black gap in mean scores was 45 points on the prose and document scales, and 59 points on the quantitative scale. The mean literacy score of Black adults on each of the three scales was about three-quarters to a whole standard deviation below mean scores of their White counterparts. The gaps between the literacy scores of White and Hispanic adults were even larger—72 points on the prose scale, 58

points on the document scale, and 59 points on the quantitative scale. Each one of these White-Hispanic literacy score gaps was greater than one standard deviation.

Table 5:
Average Prose, Document, and Quantitative Literacy Scores of Adults (16 years or Older) by Race-Ethnicity and Nativity Status, U.S.: 2003

	Prose	Document	Quantitative
<u>Race-Ethnicity</u>			
White, non-Hispanic	288.5	281.8	296.7
Black, non-Hispanic	243.1	238.0	237.9
Hispanic	216.3	224.2	232.7
Other, non-Hispanic	270.7	269.7	278.4
<u>Nativity Status</u>			
Native-Born	282.2	275.6	287.7
Foreign-Born	217.8	227.0	241.8

As among the different racial groups, there are clear differences in the literacy skills between adults in the nation who are native born and those who are born abroad, with U.S. born adults on the whole significantly outperforming those who are foreign born. The mean score of individuals who were born abroad was much lower than that of native born individuals on each of the literacy scales—64 points on the prose scale, 49 points on the document scale, and 46 points on the quantitative scale (Table 5). On each of the three scales, the mean score of foreign-born individuals was only slightly above the score that defines the lowest level of literacy performance—the Below Basic level. Foreign-born individuals have a bi-modal distribution by educational attainment. A sizable share of immigrants consists of college graduates but an even larger share consists of very poorly educated individuals with the lowest levels of literacy proficiencies. An increased reliance on immigrants for population and labor force growth has to be accompanied with serious efforts to raise their literacy proficiencies to levels that are needed to successfully participate in the labor markets and to function effectively in their personal lives at home, and in their community.

Similar to the differences across racial groups in the levels of their mean literacy scores, an examination of the distribution of the nation’s working age population across

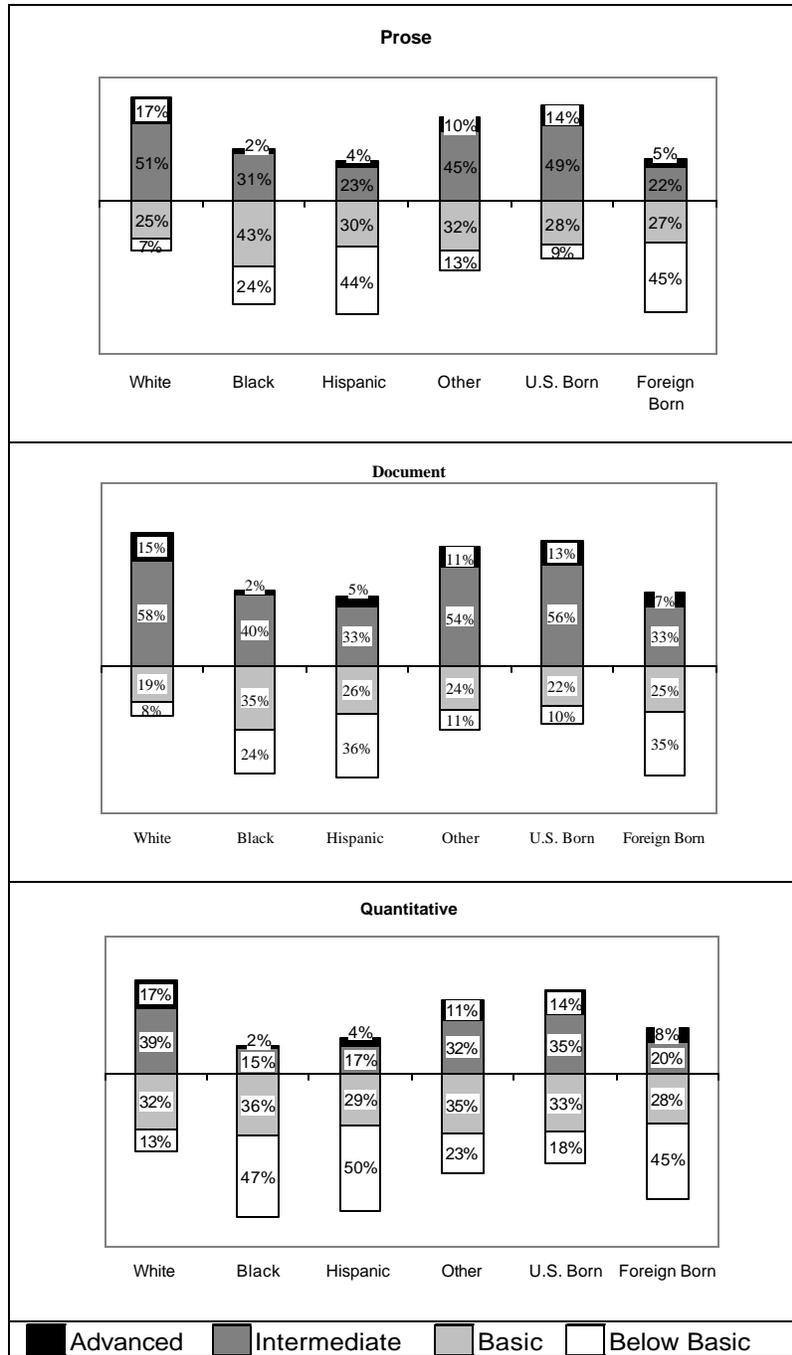
the four literacy levels reveals stark differences between these groups. Racial comparisons show that the White adult population was overwhelmingly more likely to achieve literacy scores at the highest performance levels – Intermediate and Advanced – than Black or Hispanic adults (Chart 2). In each of the three literacy areas, about 15 to 17 percent of White adults performed at the highest level of literacy compared to only 2 percent of Black adults and 4 to 5 percent of Hispanic adults. White adults also compare more favorably to Black and Hispanic adults at the lowest end of the literacy distribution—the Below Basic literacy level. On the prose scale, only 7 percent of White adults were classified in the lowest skill level compared to one quarter of Black adults and 44 percent of Hispanic adults. Similar gaps were found between the races in the document literacy area. The share of Hispanic and Black adults with Below Basic level of document skills was 36 percent and 24 percent respectively, compared to only 8 percent among the White population. The quantitative literacy of Black and Hispanic populations placed one-half of each group in the lowest level of literacy in this area compared to a somewhat large albeit relatively still smaller share of 13 percent among their White counterparts.

Comparisons of the levels of literacy by nativity status show very large differences between the two groups. In the prose literacy area, native born individuals were nearly three times as likely to perform at the highest level—the Advanced level, and more than twice as likely as foreign born individuals to perform at the second highest level (Chart 2). The foreign born population was highly concentrated in the lower levels of prose literacy. Foreign born nationals had shares in the lower levels of the prose literacy scales that were five times larger than their native born counterparts (45 percent versus 9 percent).

In the document literacy area, although a similar share of native born and foreign born adults score at the Basic performance level (22 percent and 25 percent respectively), there are considerable differences in the share of adults scoring at the lowest Below Basic performance level; while only 10 percent of native born adults scored at this low level, over a third of all foreign born adults (35 percent) scored at this minimal level. Meanwhile at the more complex performance levels, while over half of all U.S born adults (56 percent) achieved document scores at the Intermediate level and 13 percent

achieved at the Advanced level, only a third of foreign born adults scored at the Intermediate level and only 7 percent achieved at the highest Advanced document performance level.

Chart 2:
Percentage Distribution of the Adult (16 years or older) Population by the Level of their Prose, Document, and Quantitative Literacy Scores, by Race-Ethnicity and Nativity Status, U.S.: 2003



Stark differences between native-born and foreign born adults are also evident in the quantitative skill area. At the two higher levels of performance native-born adults overwhelmingly out performed foreign-born adults. The difference between the two groups at the Advanced level was 13 percent among the native born population compared to only 7 percent among those born abroad, and at the Intermediate level it was 56 percent among the native born and only one-third among those who were born abroad. The concentration of foreign-born individuals was at the lowest level of quantitative literacy. Forty-five percent of all foreign born adults demonstrated Below Basic level of quantitative skills compared to only 18 percent of native born adults. These data clearly demonstrate that areas of the nation with high shares of immigrant, Black, and Hispanic populations can therefore be expected to have lower levels of literacy among their adult populations.

The Race-Ethnicity and Nativity Characteristics of the Working Age Population in Philadelphia City, Suburban Philadelphia, Pennsylvania, and the U.S., 2005

What are the race-ethnicity and nativity characteristics of the population in Pennsylvania and Philadelphia? The race-ethnic composition of the resident working-age population of Philadelphia reveals higher shares of groups with lower literacy levels. Philadelphia city had a considerably higher share of race-ethnic minorities, especially Black and Hispanic populations, compared to the surrounding suburban communities, the state of Pennsylvania, and the nation (Table 6). Only 42 percent of the resident working-age population in Philadelphia city was non-Hispanic White in 2005; representing less than half of the share of White residents in the suburban Philadelphia area and the state of Pennsylvania (42 percent in Philadelphia city versus 85 percent in Suburban Philadelphia and in Pennsylvania). White, non-Hispanics accounted for 70 percent of the nation's working-age population in 2005. The Black population accounted for 41 percent of the city's 16+ population, and about 10 percent was Hispanic. The remaining 7 percent were members of other race groups (Asian, Pacific Islanders, Native Americans, and other race groups including mixed races).

In 2005, Philadelphia city also had higher concentrations of immigrants. Over 17 percent of the city's adult population consisted of immigrants; more than 8 percentage points higher than the share of foreign-born persons in the surrounding suburbs and over

2.5 times as high as immigrant shares across the entire state. The city also had a higher share of immigrant population compared to the nation (17.2 percent in Philadelphia city versus 15.5 percent in the nation).

Table 6:
Percentage Distribution of Working-Age (16 years of Age and Older) Residents of Philadelphia City and Suburban Areas, Pennsylvania, and the U.S. by Gender, Age, and Race-Ethnicity, 2005

	Philadelphia City	Philadelphia Suburbs	Pennsylvania	U.S.
<u>Total</u>	100.0%	100.0%	100.0%	100.0%
<u>Race-Ethnicity</u>				
White, non-Hispanic	41.8%	84.6%	84.5%	69.5%
Black, non-Hispanic	41.2%	7.7%	8.8%	11.2%
Hispanic	9.7%	2.4%	3.5%	12.9%
Other, non-Hispanic	7.4%	5.3%	3.2%	6.4%
<u>Nativity Status</u>				
Native-Born	82.8%	90.2%	93.2%	84.5%
Foreign-Born	17.2%	9.8%	6.8%	15.5%

Given the sizable proportions of race-ethnic minorities and immigrants in Philadelphia city and the considerably lower literacy scores of these groups at the national level, one could infer that the overall literacy levels in Philadelphia city would be lower compared to the surrounding suburbs, the state, and the nation. If the population of an area contains large shares of demographic subgroups of the population that are found to have lower literacy levels from national data, then these population traits can be expected to depress the overall literacy levels of that area.

Literacy Proficiencies by Educational Attainment, US: 2003

The level of educational attainment is very closely related to the level of literacy skills of the population. Individuals with higher levels of education are expected to have higher literacy skills than those with lower levels of educational attainment. Our analysis of the National Longitudinal Survey has found very strong correlations between youth who tested high on basic skills tests that were administered in 1997 (when they were between 12 and 18 years old) and their level of educational attainment in 2004 (when they were between the ages of 19 and 25). For example, among those youth who scored

in the lowest one-fifth of distribution of basic skills scores, over 31 percent were high school dropouts compared to 0.7 percent high school dropouts among those who scored in the highest one-fifth of the basic skills distribution. Only 9 percent of the youth with the lowest basic skills at the ages of 12 to 18 were enrolled in college when they were 19 to 25 years old, compared to 55 percent of the high literacy group; fewer than 2 percent of the youth with the lowest basic skills had earned a 2-year or 4-year college degree compared to 23 percent of those with the highest skill levels. Individuals with higher levels of skills are more likely those with lower skill levels to do well in school, to graduate from high school, to enroll and persist in college, and earn a college degree.⁶

The literacy proficiencies of the nation's working-age population increased sharply with educational attainment. A comparison of the mean literacy scores of the nation's adult population shows enormous literacy gaps by the level of educational attainment. Individuals with higher levels of education had higher literacy scores on each of the three literacy scales. High school dropouts had the lowest mean literacy scores on each of the three scales. The mean score of high school dropouts was 206 on the prose scale, 208 on the document scale, and 211 on the quantitative scale. These mean scores are barely as high as the score that defines the lowest literacy level—Below Basic. The gaps between the mean score of high school graduates and high school dropouts were very large. The mean score of high school graduates was between 50 and 58 points higher (representing about one standard deviation) than that of high school dropouts in all three literacy areas.

College graduates who earned a bachelor's degree or higher outperformed all other educational groups with mean prose score of 320, mean document score of 307, and mean quantitative score of 327. In each of the three literacy areas, the gap between the mean score of college graduates with a bachelor's degree or higher level of education and the mean score of high school graduates was between 49 and 59 points representing between 0.9 to 1 standard deviations. The gaps between the literacy performance of high school dropouts and 4-year college graduates stood at 114 points or 1.7 times the

⁶ Neeta P. Fogg and Paul E. Harrington, *Literacy and Post Secondary Enrollment, Retention and Completion: Key Findings from the National Longitudinal Survey*, Center for Labor Market Studies, Northeastern University, March, 2007

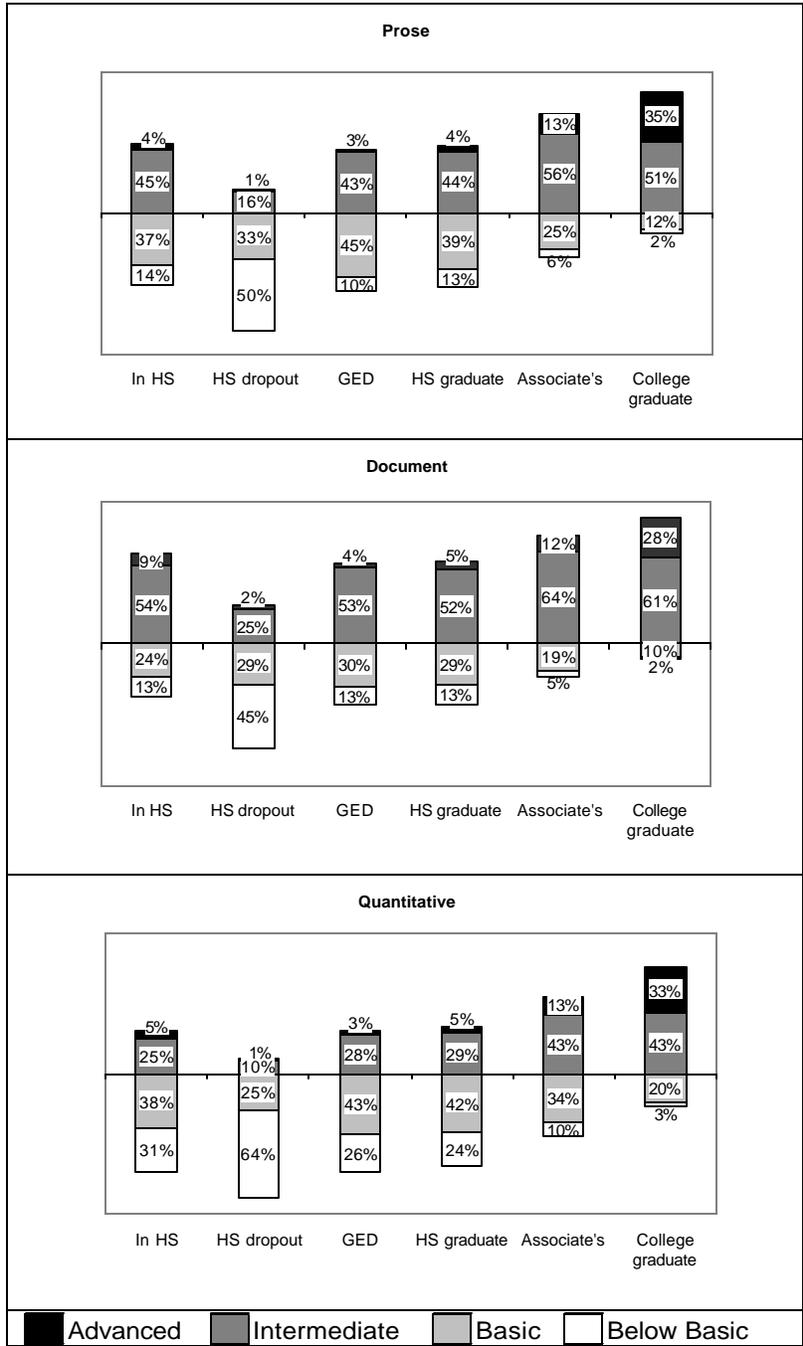
standard deviation in the prose literacy area, 116 points or 1.9 times the standard deviation in the quantitative literacy area, and 99 points or 1.7 times the standard deviation in the document literacy area.

Table 7:
Average Prose, Document, and Quantitative Literacy Scores of Adults
(16 years and Older) by Educational Attainment, U.S.: 2003

	Prose	Document	Quantitative
<u>Educational Attainment</u>			
Enrolled in High School	262.0	264.6	260.9
High School Dropout	206.3	208.0	211.1
High School Graduate/GED	261.3	257.8	268.6
Some college, no degree	281.0	275.9	289.6
Associate's degree	298.0	290.9	305.5
Bachelor's Degree or Higher	320.2	307.0	327.4

The stark differences in the literacy proficiencies of the different educational groups are clearly demonstrated by the distribution of the education subgroups across the four literacy levels (Chart 3). The likelihood of Advanced literacy levels among high school dropouts was extraordinarily remote. Only between 1 and 2 percent of adult high school dropouts earned scores on the prose, document, and quantitative literacy areas that would place them in the advanced literacy category. High school dropouts were mostly concentrated in the two lowest levels of literacy. One half had Below Basic and one-third had Basic levels of prose literacy. Forty-five percent had Below Basic document skills and 29 percent demonstrated document skills at the second lowest level—Basic level. The quantitative skills of high school dropouts placed nearly 90 percent in the Below Basic (64 percent) or the Basic level (25 percent). In sharp contrast, nearly 80 to 90 percent of college graduates had Intermediate or Advanced levels of literacy skills. In each of the three literacy areas, higher educational attainment consistently corresponds with higher concentrations of adults in Advanced and Intermediate literacy levels and lower concentrations in the Basic and Below Basic levels.

Chart 3:
Percentage Distribution of the Adult (16 years or older) Population by the Level of their
Prose, Document, and Quantitative Literacy Scores, by Educational Attainment, U.S.:
2003



The Educational Attainment of the Working Age Population in Philadelphia City, Suburban Philadelphia, Pennsylvania, and the U.S., 2005

The presence of a disproportionate share of high school dropouts and individuals with lower levels of education among working-age residents of an area is expected to sharply depress the literacy proficiencies of the workforce of that area. The education levels of Philadelphia city’s working-age adults also point to relatively low literacy levels in the city. Nearly one-fifth of the working-age population of the city consisted of high school dropouts. The share of high school dropouts was much lower in the suburbs of Philadelphia (8 percent).⁷ The entire state of Pennsylvania and the nation also had lower shares of high school dropouts compared to Philadelphia city (12 percent in Pennsylvania and 15 percent across the nation).

Table 8:
Percentage Distribution of Working-Age (16 years of Age and Older) Residents of Philadelphia City and Suburban Areas, Pennsylvania, and the U.S. by Educational Attainment, 2005

Education	Philadelphia City	Philadelphia Suburbs	Pennsylvania	U.S.
Total	100.0%	100.0%	100.0%	100.0%
<u>Educational Attainment</u>				
Enrolled in High School	5.1%	4.7%	4.3%	4.4%
High School Dropout	19.5%	7.9%	12.5%	14.7%
High School Graduate/GED	36.6%	29.3%	37.1%	29.1%
Some college, no degree	14.9%	16.5%	16.1%	20.8%
Associate’s degree	4.5%	6.2%	6.6%	6.8%
Bachelor's Degree or Higher	19.3%	35.3%	23.3%	24.1%

Most of the city’s working-age population was concentrated at the lower end of the educational credentials. The proportion of resident Philadelphians with a 4-year (or higher) college degree was only about one-half the proportion of that found in the suburban communities (19 percent in Philadelphia city versus 35 percent in the

⁷ Considerable geographic mismatches seem to exist between the educational attainment of Philadelphia’s resident population and the skill requirements of jobs located in the city see: Neeta P. Fogg, Paul E. Harrington and Kevin R. McCabe, *Job Access and Earnings of Philadelphia Residents and Commuters*, Philadelphia Workforce Investment Board, August 2005

surrounding suburbs). College graduates comprised 23 percent of the working-age population in Pennsylvania and 24 percent in the nation. Postsecondary education was much less common among the city's residents compared to the suburbs, the state, and the nation. About 39 percent of Philadelphians had some postsecondary education (some college without a degree, Associate's degree, Bachelor's degree or higher), compared to 58 percent in suburban Philadelphia, 46 percent in Pennsylvania, and 52 percent in the nation.

Literacy Proficiencies by Labor Force Status, US: 2003

The labor market places a very high premium on literacy. Higher levels of literacy proficiencies are very closely associated with better labor market outcomes—higher rates of participation in the labor force, higher employment rates, lower unemployment rates, higher earnings, and access to higher quality and full-time jobs. It is therefore no surprise that the level of literacy proficiencies of the workforce is very closely associated with their labor force status. As a group, individuals who are actively participating in the labor force have higher literacy skills than those who are out of the labor force. Among those who are in the labor force, employed individuals have higher levels of literacy than those who are unemployed. Literacy proficiencies also differ among full-time and part-time workers. Those who are employed in full-time jobs tend to have higher literacy levels than those who work in part-time jobs.

On the 2003 NAAL literacy assessment, the mean literacy scores on the prose, document, and quantitative scales, of employed individuals in the nation were between 30 and 34 points higher than the mean scores of their counterparts who were out of the labor force (Table 9). Those out of the labor force had literacy scores across the three domains that were about one half of a standard deviation below those who were actively engaged in the job market at the time of the study. Individuals who were employed in part-time jobs secured mean literacy scores that were 4 points lower than those of full-time workers in the prose and document areas, and nearly 9 points lower than the mean score of full time workers in the quantitative skill area. The literacy proficiencies of the unemployed were considerably lower than those of all workers, especially on the quantitative proficiency measure.

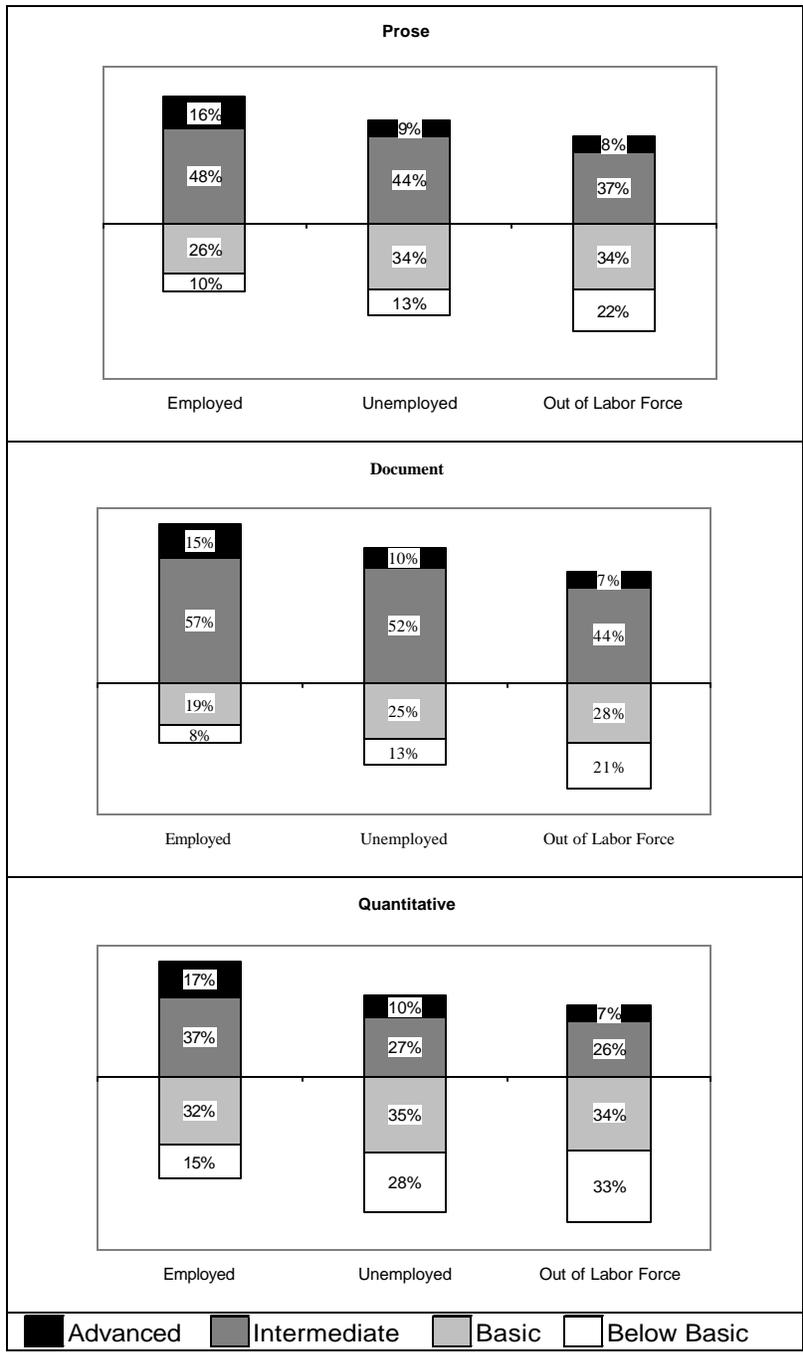
Table 9:
Average Prose, Document, and Quantitative Literacy Scores of Adults
(16 years and Older) by Labor Force Status, U.S.: 2003

	Prose	Document	Quantitative
<u>Labor Force Status</u>			
Employed	284.7	280.7	294.0
Full-Time	285.4	281.3	295.9
Part-Time	280.9	277.5	287.2
Unemployed	268.6	265.2	269.8
Not in Labor Force	255.4	249.8	260.6

An examination of the levels of literacy proficiencies of the working age population by their labor force status reveals glaring differences in the literacy proficiencies between those who were employed, unemployed, and those who had were not actively engaged in the job market. Employed individuals were twice as likely as their counterparts who were out of the labor force, to secure a score at the Advanced level and less than half as likely to score at the Below Basic level in each of the three literacy areas. Unemployed adults also were more likely to be concentrated in the Below Basic and Basic literacy levels, albeit less than those who were out of the labor force.

Over one-fifth of the adults who were out of the labor force had literacy scores on the prose and document areas that were in the Below Basic level (Chart 4). On the quantitative scale, one-third of these individuals had Below Basic level of literacy. The Below Basic level of literacy represents the ability to perform only the very simple and easy tasks. This level of functional literacy sharply reduces the chances of any employment at all for this group. Individuals who were out of the labor force were much more likely to be concentrated in the lower two levels of literacy. In the prose and document literacy areas, 55 percent and 49 percent, respectively, were concentrated in the lower two literacy levels. The quantitative literacy of these adults placed two-thirds in the bottom two levels. Only 7 or 8 percent of those who had quit the labor force had literacy proficiencies that placed them in the Advanced level.

Chart 4:
Percentage Distribution of the Adult (16 years or older) Population by the Level of their Prose, Document, and Quantitative Literacy Scores, by Labor Force Status, U.S.: 2003



The share of unemployed individuals in the two lowest literacy levels ranged from 38 percent on the document scale, 47 percent on the prose scale, and 63 percent on the

quantitative scale. Only one in ten unemployed adults in the nation had literacy proficiencies at the Advanced level which represents an ability to perform complex and sophisticated tasks in each of the three literacy areas. In sharp contrast, employed individuals were much more likely to belong to the top two literacy levels. Between 15 and 17 percent had literacy proficiencies that placed them in the Advanced level in each of the three areas. On the document, prose, and quantitative scales, respectively, 72 percent, 64 percent, and 54 percent of employed individuals possessed literacy proficiencies that placed them in the top two literacy levels—Advanced or Intermediate.

The concentration in the lower literacy levels among adults who were out of the labor force indicates that many of the low literate population simply do not participate in the labor force. In fact a look at the labor force participation rate by literacy scores shows a very strong positive relationship between literacy levels and participation in the labor force. Only one-half the adults with Below Basic level of prose literacy were in the labor force; a level that was significantly lower than the rate of participation among groups with higher levels of prose literacy proficiencies—63 percent among the Basic prose literacy level group, 74 percent among those with Intermediate prose literacy level, and 82 percent among those with the highest of the four levels of prose literacy. These findings suggest that lower levels of literacy among the residents will therefore not only result in a lower quality workforce but also in a smaller size workforce because of the weak labor market attachment of the low literate population.

The Labor Force Status of the Working Age Population in Philadelphia City, Suburban Philadelphia, Pennsylvania, and the U.S., 2005

The labor force attachment of the working age population of Philadelphia city is extremely weak. The overall labor force status of the working-age population in Philadelphia city points to lower levels of literacy proficiencies among the city's workforce compared to the surrounding suburban communities, the state of Pennsylvania, and to a lesser extent, the nation. In a preceding section we noted that Philadelphians had very low levels of educational attainment with nearly one-fifth of the adult population consisting of high school dropouts and a considerably smaller share of college graduates compared to the surrounding suburban communities and the state.

Given the low levels of educational attainment among residents of the city and the strong association between educational attainment and labor force attachment, it is not surprising to find that working-age Philadelphians were less likely to be employed and more likely to be unemployed or out of the labor compared to their counterparts residing in the Philadelphia suburbs, the state of Pennsylvania, or the nation. Only 52 percent of the city’s working-age residents were employed (the group with the highest literacy scores) compared to 65 percent in the surrounding suburban communities, 60 percent in the state and 61 percent in the nation. Fully 7 percent of the working age residents of the city were unemployed, yielding an unemployment rate of nearly 12 percent. The share of unemployment residents was only 3.4 percent in the suburbs and slightly over 4 percent in the state and the nation. The unemployment rate in these areas was also very low—5 percent in the suburban communities and 6.6 percent and 6.8 percent, respectively, in the state of Pennsylvania and the nation during 2005.

Table 10:
Percentage Distribution of Working-Age (16 years of Age and Older)
Residents of Philadelphia City and Suburban Areas, Pennsylvania,
and the U.S. by Labor Force Status, 2005

Education	Philadelphia City	Philadelphia Suburbs	Pennsylvania	U.S.
Total	100.0%	100.0%	100.0%	100.0%
<u>Labor Force Status</u>				
Employed	52.0%	65.0%	59.8%	61.4%
Unemployed	7.0%	3.4%	4.2%	4.5%
Unemployment rate	11.9%	4.9%	6.6%	6.8%
Not in Labor Force	40.9%	31.5%	36.0%	34.1%

Many more working age residents of Philadelphia opt out of participating in the labor force compared to their counterparts in the suburb and the state as a whole. Nearly 41 percent of the city’s working-age residents were out of the labor force, nearly 10-percentage points higher than the suburbs (31 percent), 6-percentage points higher than the state (36 percent) and 8-percentage points higher than the rate of out of the labor force residents in the nation (34 percent). Given the low levels of literacy proficiencies among

the nation's adults who were out of the labor force and the disproportionate concentration of Philadelphia city's adults who were out of the labor force, these findings are further symptoms of likely low literacy proficiencies among the cities working age population.

Simulation of the Literacy Proficiencies of the Residents of Philadelphia City, Suburban areas of Metropolitan Philadelphia, and Pennsylvania

The above analyses of the differences in the literacy scores among different population subgroups and the distribution of Philadelphia's working-age population across these population subgroups provide insights on the expected literacy levels among working-age residents of Philadelphia city. As noted above, Pennsylvania did not participate in the state level assessment of the 2003 NAAL. Direct measurement of the literacy scores of the population of the state and the city of Philadelphia therefore cannot be produced from the 2003 NAAL. In the absence of direct estimates of the literacy proficiencies of the adult population of Philadelphia city, we have produced simulated estimates of the literacy scores of the working-age population and simulated distribution of the working age population across the four levels of literacy proficiencies in each of the three literacy areas for Philadelphia city, the surrounding suburban communities and the state of Pennsylvania. In this section of the paper, we present a more detailed description of the methodology that we have used to produce the simulated literacy proficiencies and the simulated literacy levels and the findings from these simulations about the literacy proficiencies of the residents of Philadelphia city, suburban Philadelphia, and Pennsylvania.

The Simulation Methodology

The literacy scores and literacy levels of the population have been simulated with the weighted average methodology that uses data on the characteristics of the residents of Philadelphia city as weights along with the literacy scores of the nation's residents to simulate the literacy scores of Philadelphia's residents. In the weighted average methodology, the simulated literacy scores of the population are the sum of the product of the following two variables: the mean literacy scores of each subgroup of the population in the nation and the share of each population subgroup among Philadelphia's residents (used as weights). For example, if we were to simulate the literacy scores for

Philadelphia’s residents from the national literacy scores based upon gender weights, then we would require information on the national literacy scores for men and women, and the share of men and women among the working-age residents of Philadelphia. Based upon this information, a simulated literacy score for Philadelphia would be computed as illustrated in Table 11. First, the national mean prose score of males (273) is multiplied by the weight associated with the male score—the share of males in the working-age population of Philadelphia city 45 percent or .45—to produce the one component of the

Table 11:
An Illustration of the Simulation of the Prose Literacy Score
in Philadelphia City Based Upon Gender Weights

Row		(A) Mean Prose Scale Score, U.S.	(B) Gender Distribution of Philadelphia's 16+ Population	(C) Weighted Prose Score (Column A* Column B)
1	Male	273	0.45	122.85
2	Female	277	0.55	152.35
Simulated prose scale score for Philadelphia city (Row 1+ Row 2 in Column C)				275.2

simulated score on the prose scale for Philadelphia city (122.85). The process is then repeated for females. The national mean prose score for females (277) is multiplied by the share of females in the working-age population of Philadelphia city (.55) to produce the second component of the prose score (152.35). In this example, the simulated prose literacy score for Philadelphia city is 275.2 and is computed from the sum of the two components (122.85+152.35=275.2).

The example above uses only two subgroups of the population to simulate literacy scores and the weights used in the example are based upon the shares of males and females in the working-age population of Philadelphia. The actual simulations of the literacy scores are based on the population distribution weights derived from a combination of gender, age, and race-ethnicity composition of Philadelphia’s working-age population. These were combined with the mean literacy scores of the same

subgroups of the nation’s population. While it is desirable to use more detailed population subgroups as weights, the NAAL sample size restricts the number of subgroups for which mean literacy scores can be produced. Moreover, we selected weights based upon gender, age, and race-ethnicity because this allows us to produce simulated scores not just for 2005 based upon ACS (American Community Survey) data and 1990 based upon the 1990 decennial census data, but also for the year 2030 based upon population projections data that are only available for gender, age, and race-ethnicity subgroups of the population. Population projections are not available for other subgroups of the population that are included in our analysis in the preceding sections of this report.

We have produced estimates for 32 subgroups of the population based upon gender, age, and race-ethnicity. The precise list of subgroups based upon this gender-age-race combination is presented on Table 12. These subgroups groups consist of 2 gender

Table 12:
A List of the 32 Subgroups Based Upon Gender, Age, and Race-Ethnicity that were used to Compute Weights Used in Producing Simulated Literacy Scores

Subgroup Number	Age	Race-Ethnicity	Subgroup Number	Age	Race-Ethnicity
Male			Female		
1	16-24	White, non-Hispanic	17	16-24	White, non-Hispanic
2	16-24	Black	18	16-24	Black
3	16-24	Hispanic	19	16-24	Hispanic
4	16-24	Other	20	16-24	Other
5	25-39	White, non-Hispanic	21	25-39	White, non-Hispanic
6	25-39	Black	22	25-39	Black
7	25-39	Hispanic	23	25-39	Hispanic
8	25-39	Other	24	25-39	Other
9	40-49	White, non-Hispanic	25	40-49	White, non-Hispanic
10	40-49	Black	26	40-49	Black
11	40-49	Hispanic	27	40-49	Hispanic
12	40-49	Other	28	40-49	Other
13	50+	White, non-Hispanic	29	50+	White, non-Hispanic
14	50+	Black	30	50+	Black
15	50+	Hispanic	31	50+	Hispanic
16	50+	Other	32	50+	Other

groups, 4 age groups, and 4 race-ethnicity groups. Each of the 2 gender groups are divided into 4 age groups and each age group in turn is divided into 4 race groups. There are 16 subgroups of the male population and 16 subgroups of the female population bringing the total to 32 subgroups. These 32 groups are mutually exclusive and the sum of the population in these 32 groups is equal to the total working-age population. We have used the percentage distribution of the population of Philadelphia city, Philadelphia suburbs, Pennsylvania derived from the 2005 ACS public use data files as weights to produce weighted average simulated prose, document, and literacy scores for the working-age population in these areas from the actual mean literacy scores of these 32 subgroups of the nation's population.

Similar to the simulation of the literacy scores, the literacy levels of the population of Philadelphia city were also simulated with the weighted average methodology. The same 32 gender-age-race subgroups that were used in the simulation of literacy scores were used in the simulation of literacy levels. The first step in the simulation of the levels of literacy is to use the 2003 NAAL to derive the percentage distribution of the nation's population across the four literacy levels in each of the 32 subgroups. The second step is to estimate the number of working-age residents in each of the 32 gender-age-race subgroups in Philadelphia city. In the third step, the percentage distribution across literacy levels from step 1 are applied to the total number of residents of Philadelphia in each of the 32 subgroups in step 2, to produce the total number of residents in each of the 32 subgroups with Below Basic, Basic, Intermediate, or Advanced level of literacy proficiencies. The final step in the literacy level simulation process produces the simulated distribution of the total working-age population of Philadelphia city across the four literacy levels. This is derived (step 4) from the sum of the number of residents in the 32 population subgroups within each literacy level category.

An example of such a simulation of literacy levels using 4 race-ethnicity subgroups (instead of than the 32 gender-age-race subgroups used in our actual simulations) is provided in four steps listed below:

Step 1: Using the 2003 NAAL, estimate the percentage distribution by literacy level in each of the working-age population subgroups selected for the simulation (for this example, we have selected race-ethnicity subgroups for the simulation)

Race/Ethnicity	Total	Below			
		Basic	Basic	Intermediate	Advanced
White	100%	7.4%	25.0%	51.0%	16.6%
Black	100%	23.9%	42.8%	31.1%	2.2%
Hispanic	100%	44.4%	29.5%	22.5%	3.6%
Other	100%	12.9%	32.3%	45.0%	9.8%

Step 2: Estimate the total population within each population subgroup selected for the simulation in Philadelphia (for this example, we have provided the number of working-age Philadelphians in 4 race-ethnicity subgroups from the 2005 American Community Survey)

2005 Working-Age Population of Philadelphia City	Total	White	Black	Hispanic	Other
	1,079,704	450,873	444,419	104,491	79,921

Step 3: Apply the percentage distribution of each population subgroup (step 1) to the total population in each population subgroup (step 2) to obtain the simulated number of Philadelphia residents in each race-ethnicity with Below Basic, Basic, Intermediate literacy levels. For example, 7.4 percent of the nation’s White working-age population had Below Basic prose literacy level and there were 450,873 White working-age residents in Philadelphia city in 2005. 7.4% of 450,873 is equal to 33,365 which represents the number Philadelphia’s white residents with Below Basic prose literacy skills ($0.074 \times 450,873 = 33,365$).

Race/Ethnicity	Below			
	Basic	Basic	Intermediate	Advanced
White	33,365	112,718	229,945	74,845
Black	106,216	190,211	138,214	9,777
Hispanic	46,394	30,825	23,510	3,762
Other	10,310	25,814	35,964	7,832

Step 4: Add the number of White, Black, Hispanic, and Other residents in each literacy level column to obtain the race-based simulated number of Philadelphians in each prose literacy level. For example, the sum simulated number of White, Black, Hispanic, and Other race working-age residents of Philadelphia with Below Basic prose literacy levels ($33,365 + 106,216 + 46,394 + 10,310 = 196,285$) produces a total of 196,285, which represents the race-based simulated number of Philadelphia city’s residents with Below Basic level of prose literacy.

	Total	Below			
		Basic	Basic	Intermediate	Advanced
Total	1,079,704	196,285	359,569	427,634	96,216
% Distribution	100.0%	18.2%	33.3%	39.6%	8.9%

We have used the methodology described above and applied it to 32 gender-age-race subgroups of the population to produce gender-age-race based simulated literacy levels of the working-age population of Philadelphia city, the surrounding suburban communities and the entire state of Pennsylvania. We have also used the population of Philadelphia city in the 32 gender-age-race subgroups in 1990 and 2030 to produce similar simulations of the literacy levels of the city's population in 1990 and 2030 based upon the composition of the city's population in the 32 gender-age-race subgroups in 1990 and the projected population in the same 32 subgroups in the year 2030.⁸

Simulated Literacy Scores

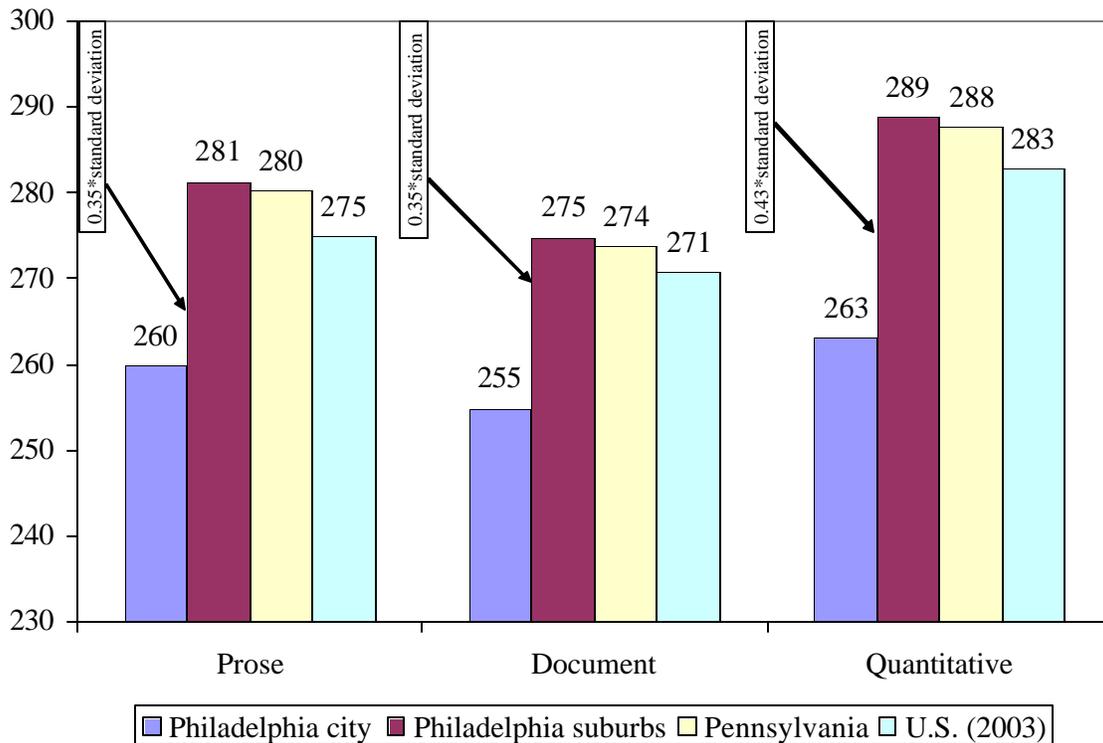
Findings from our simulations to produce literacy scores for Philadelphia city and suburbs and for the state of Pennsylvania along with the actual 2003 NAAL literacy scores for the nation's working-age population are presented in Chart 5. The simulated literacy scores for the working age population in Philadelphia city were much lower than the literacy scores in the other areas with the highest literacy scores among residents of suburban Philadelphia. The second highest scores were among residents of the entire state of Pennsylvania. The mean literacy scores of the nation's residents were lower than their counterparts in Pennsylvania and the suburbs of the Philadelphia metro area but higher than those of the residents of Philadelphia city. The simulated prose literacy score of the residents of the city (260) was 20 to 21 points lower than the prose score of suburbanites within the metro area and the state, representing a difference of 0.35 standard deviations, and 15 points lower than that of the nation.

The gaps between the literacy scores of Philadelphians and other areas were also quite large in the area of document literacy. The simulated score of the city's working-age residents on the document literacy scale was 255 or 19 to 20 points (about 0.35 standard deviations) lower than the simulated document scale score of Philadelphia suburbanites and all Pennsylvanians and 16 points lower than the nation. The simulated quantitative literacy score of city residents was 263. The quantitative literacy gaps

⁸ The 2000 decennial census-based population projections for the 32 age-gender-race subgroups are not available for Philadelphia city or for the state of Pennsylvania. Therefore we have applied the national 2005-2030 projected rate of change in the population in each of the 32 gender-age-race subgroups to the 2005 population levels in these 32 subgroups in Philadelphia city to produce the 2030 projected population for each subgroup in the city.

between Philadelphians and other areas were even larger. Residents of suburban Metro Philadelphia area had a simulated quantitative literacy score of 289 which was 26 points or 0.43 standard deviations higher than that of city residents. Pennsylvania residents' simulated quantitative literacy score was 288 or 25 points higher than city residents. The mean 2003 NAAL quantitative scale score representing the quantitative literacy proficiencies of the nation's population was 283 or 20 points higher than that of the residents of Philadelphia city.

Chart 5:
Prose, Document, and Quantitative Literacy Scores of Adults (16 years of Age and Older) in Philadelphia City, Philadelphia Suburbs, and Pennsylvania (Simulated 2005) U.S. (Actual NAAL 2003)



Utilizing weights derived from the characteristics of Philadelphia population in 1990 and the mean 2003 NAAL literacy scores, we have produced simulated literacy scores of the working-age residents of Philadelphia in 1990. We have also produced simulated literacy scores of the city's residents for the year 2030 based upon population projections in 2030. Population projections for Philadelphia city are not available for the

32 age, gender and race subgroups that we used in our simulations. Although the population projections for the 32 gender-age-race subgroups are available for Pennsylvania, we did not use these projections because they based upon the 1990 decennial census and are therefore outdated. The most recent (2000 decennial census-based) age by gender by race-ethnicity population projections are not yet available for Pennsylvania.

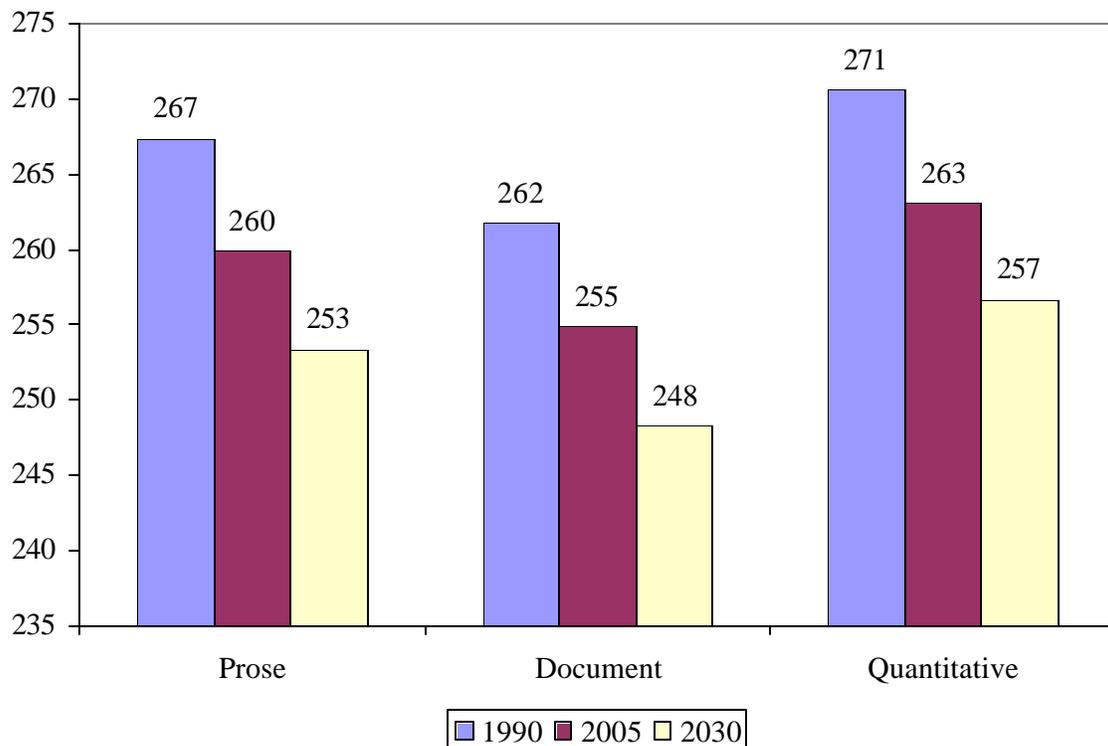
In the absence of 2000 decennial census-based population projections for the 32 age-gender-race subgroups for Philadelphia city or Pennsylvania, we have applied the 2005-2030 projected rate of change in the population of the nation in each of the 32 gender-age-race subgroups to the 2005 population levels in these 32 subgroups in Philadelphia city to produce the level of 2030 projected population within each subgroup in the city. The percentage distribution of the 2030 projected population for Philadelphia city across the 32 sub groups was used as weights along with the 2003 NAAL mean literacy scores for the 32 subgroups to produce the 2030 simulated literacy scores for the working-age population of Philadelphia city. Findings of the simulated literacy scores of the working-age population of Philadelphia in 1990, 2005, and 2030 are presented in Chart 6.

A comparison of the simulated literacy levels of the working age population of Philadelphia between 1990, 2005, and 2030 reveals a downward trend in the literacy proficiencies of the city's population (Chart 6). The simulated prose literacy score of the city's population declined from 267 in 1990 to 260 in 2005 and 253 in 2030. On the document scale the decline in the city's simulated literacy score was from 262 in 1990, 255 in 2005 and further down to 248 in 2030. The quantitative skills of the working-age residents of Philadelphia have also declined since 1990 and are expected to decline further by the year 2030.

The simulated prose and document literacy scores of the working-age population in Philadelphia city declined by 7 points each and the simulated quantitative score declined by 8 points between 1990 and 2005. Between 2005 and 2030, the prose and document literacy scores of the city's residents are expected to decline by another 7 points and the quantitative scores by another 6 points. Over the time period between 1990

and 2030, the literacy proficiencies of the city’s population are expected to decrease sharply. In each of the three areas, the scores are expected to decline by about 5.5 percent or one-quarter of a standard deviation. These simulations are based upon the gender, age, and race characteristics of the population. As a result the entire change in the simulated scores is attributable to the change in the gender by age by race composition of the city’s population.

Chart 6:
Simulated Prose, Document, and Quantitative Literacy Scores of Adults
(16 years of Age and Older) in Philadelphia City, 1990, 2005, & 2030



Simulated Literacy Levels

The literacy levels of the working-age population of Philadelphia city, suburban Philadelphia, and the state of Pennsylvania in each of the three literacy areas were computed using the simulation methodology described in a preceding section and is based upon the gender-age-race composition of the working-age population in 2005 in each of these three areas, and the 2003 literacy levels of the nation’s population. The

findings from these simulations are presented in Table 13. A comparison of the literacy levels of the population in the city, suburbs, the state, and the nation reveals that the residents of Philadelphia city had the lowest level of literacy. On the prose and document scale, almost one-fifth of the city's working-age population, representing between 197,000 and 205,000 individuals, had Below Basic level of literacy proficiencies. On the quantitative scale, one-third of the city's population or 347,000 individuals had Below Basic level of literacy. Individuals with Below Basic levels of literacy are able to perform only the very simplest of tasks and are likely to face substantial barriers in the labor market. In each of the literacy areas, the city's population is nearly two times as likely as their suburban counterparts to have Below Basic level of literacy proficiencies.

Table 13:
Simulated Distribution of the Working-Age Population, by Literacy Levels, 2005

	Below Basic	Basic	Intermediate	Advanced	Total
<u>Prose</u>					
U.S. (2003)*	13.6%	28.8%	42.4%	15.3%	100%
Pennsylvania	10.8%	27.1%	47.8%	14.2%	100%
Philadelphia suburbs	10.3%	27.0%	48.3%	14.4%	100%
Philadelphia city:					
Percent	19.0%	33.2%	39.1%	8.7%	100%
Number	204,980	358,895	422,188	93,642	1,079,704
<u>Document</u>					
U.S. (2003)*	12.4%	22.4%	52.6%	12.6%	100%
Pennsylvania	10.8%	21.1%	55.0%	13.0%	100%
Philadelphia suburbs	10.4%	20.9%	55.5%	13.2%	100%
Philadelphia city:					
Percent	18.3%	26.6%	47.1%	8.0%	100%
Number	197,826	286,909	508,971	85,998	1,079,704
<u>Quantitative</u>					
U.S. (2003)*	21.5%	32.7%	32.5%	13.4%	100%
Pennsylvania	18.2%	32.2%	35.2%	14.4%	100%
Philadelphia suburbs	17.5%	32.2%	35.7%	14.7%	100%
Philadelphia city:					
Percent	32.2%	33.2%	26.0%	8.6%	100%
Number	347,373	358,994	280,431	92,906	1,079,704

*Actual data from the 2003 NAAL

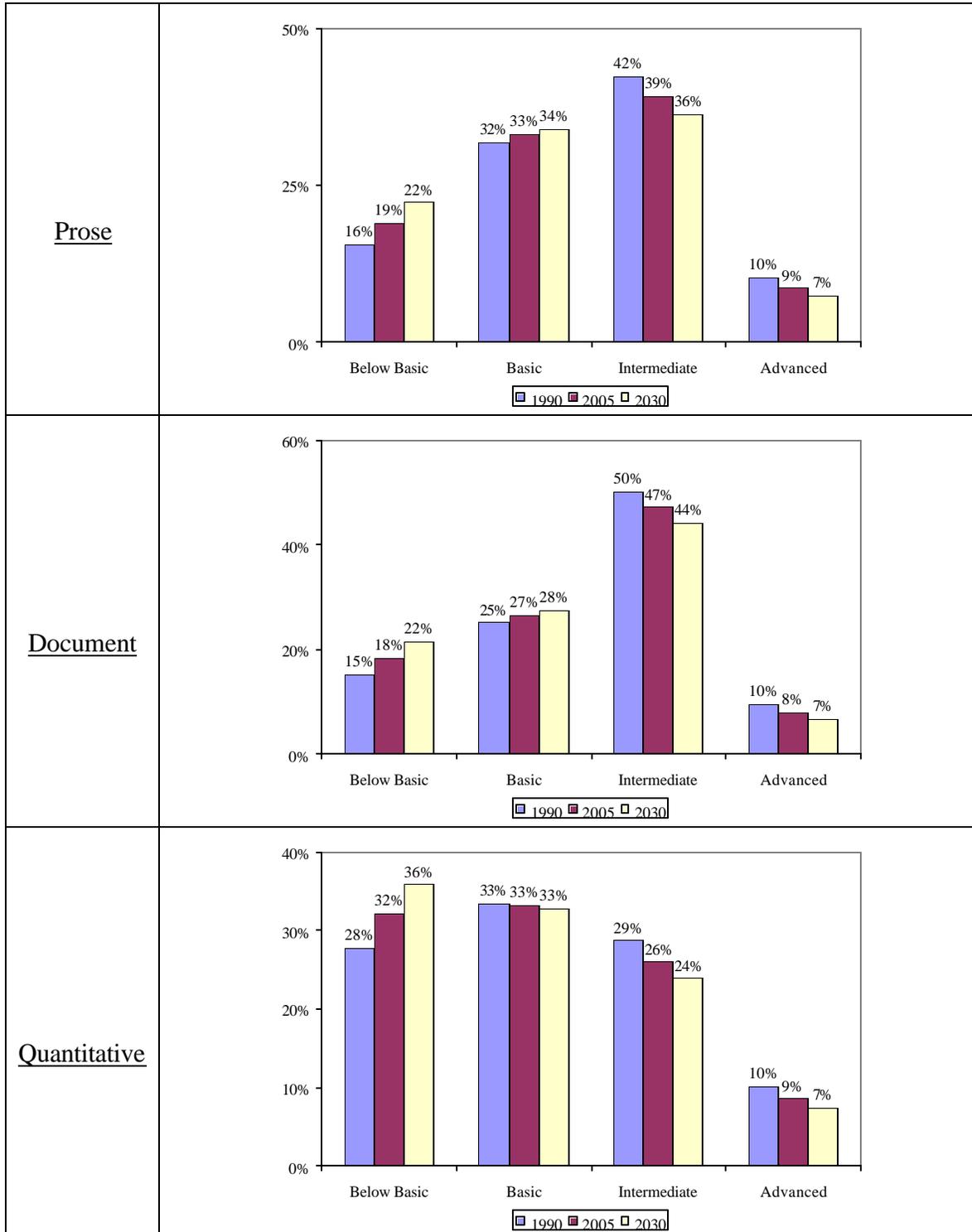
Simulations based upon 4 race groups, 4 age groups, and gender

The city also had disproportionate concentrations of working-age residents with literacy proficiencies that placed them in the second lowest level or the Basic level of literacy. Although individuals with Basic literacy levels have somewhat higher levels of literacy proficiencies than those with Below Basic level skills, this group of individuals still have sizable skills deficits compared to the literacy levels needed to be employable in many of the jobs that are available in the Philadelphia labor markets. One-third of the city's population had literacy proficiencies that placed them in the second lowest level or the Basic literacy level on the prose and quantitative scale, and one-quarter had Basic level skills in the document literacy area. Together, the share of the city's population that had Below Basic or Basic levels of literacy was 52 percent in the prose literacy area, 45 percent in the document literacy area, and nearly two-thirds on the quantitative literacy area. The concentration of individuals with Below Basic and Basic literacy levels was lower across the state of Pennsylvania as well as in the suburban Philadelphia metropolitan area; 37 to 38 percent on the prose scale, 31 to 32 percent on the document scale, and about one-half on the quantitative scale.

The working-age population in the city had very small shares—8 to 9 percent—of individuals with Advanced literacy levels. Only 86,000 to 94,000 individuals out of over one million working age residents of the city had literacy proficiencies at the highest level—the Advanced level. The Advanced level of literacy proficiencies was much more prevalent in the surrounding suburban communities and the state of Pennsylvania. Between 13 and 14 percent of the population in these two areas had Advanced skills in each of the three literacy areas.

Simulations of the literacy proficiencies (literacy scores and literacy levels) of the population of Philadelphia city clearly demonstrate the large literacy deficits among the city's working-age population. An examination of the trends in the literacy levels of the city's population illustrate a deterioration between 1990 and 2005 with more deterioration expected in the future through the year 2030 based upon the gender-age-race characteristics of the projected population of the city. Between 1990 and 2030, the city has seen a decline in the simulated literacy levels as demonstrated by an increase in the share of the population with Below Basic skill levels from 16 percent to 22 percent in

Chart 7:
Changes in the Distribution of the Working-Age Population in Philadelphia City by Simulated* Literacy Levels in the Prose, Document, and Quantitative Areas, 1990, 2005, & 2030



*Simulations based upon 4 race groups, 4 age groups, and gender

the prose literacy area, 15 percent to 22 percent in the document literacy area, 28 percent to 36 percent in the quantitative literacy area (Chart 7).

The share of the city's residents with the second lowest or the Basic level of literacy also increased between 1990 and 2005 and is expected to increase between 2005 and 2030 in the prose and document areas. In the quantitative skill area, the share of residents with Basic level of quantitative skills has remained unchanged between 1990 and 2005 and is projected to remain unchanged at 33 percent between 2005 and 2030. The share of the resident population with Intermediate or Advanced literacy levels declined sharply in each of the three literacy areas. A clear shift of the city's population from higher to lower literacy levels has occurred between 1990 and 2005 and the changes towards lower literacy levels among the city's working-age residents are projected to continue over the next 25 years between 2005 and 2030.

These large shifts towards lower literacy levels among the potential workforce of the city seriously restrict the potential for economic growth in Philadelphia. The demographic changes that have occurred in the city between 1990 and 2005, and the demographic changes that are projected to occur in the city between 2005 and 2030, both point to a steady and continuous decline in the literacy proficiencies of the population and raise serious doubts about the city's ability to attract businesses with a skilled workforce, to increase employment opportunities for the city's residents, and to raise the earnings, incomes, and living standards of all residents of the city. The small group of residents with higher level literacy proficiencies and the growing share of the population with lower literacy levels will likely result in a widening of the income and earnings disparities in Philadelphia.

Appendix Table A1

Prose, Document and Quantitative Skill Examples, by the Four Literacy Levels

Literacy Area: Prose	Level: Below Basic	Score: 0-209
Description of ability	May be able to locate information in short texts when the information is easily identifiable	
Examples of NAAL tasks	<ul style="list-style-type: none"> ▪ Use a text of a short paragraph to answer a question where a literal match occurs, e.g., use the statement “Alison is from Scotland” to answer the question, “What country is Alison from?” ▪ Underline a specific sentence in a government form or newspaper article. 	
	Level: Basic	Score: 210-264
Description of ability	Is able to read, understand, follow directions, copy and locate information in short texts where information is easily identifiable with a minimal number of distractions in the main text.	
Examples of NAAL tasks	<ul style="list-style-type: none"> ▪ Read a short story or newspaper article and underline or circle the sentence that answers a question, e.g., why an event occurred. ▪ Locate specific information in a government form, e.g., the definition of blind on a Social Security Administration informational handout. 	
	Level: Intermediate	Score: 265-339
Description of ability	Is able to read and understand moderately dense, less commonplace text as well as summarizing, making simple inferences, determining cause and effect, and recognizing the author’s purpose.	
Examples of NAAL tasks	<ul style="list-style-type: none"> ▪ Locate information in a short newspaper article or a government form, e.g., government form regarding Social Security benefits. ▪ Use an almanac or other reference material, e.g., to find three food sources that contain Vitamin E). ▪ Read a short poem and identify or infer the situation described by the poem. ▪ Write a letter to a credit department informing them of an error on a bill statement. 	
	Level: Advanced	Score: 340-500
Description of ability	Is able to read lengthy complex, abstract prose texts as well as synthesize information and make complex inferences.	
Examples of NAAL tasks	<ul style="list-style-type: none"> ▪ Read a newspaper article and identify the argument used by the author. ▪ Orally summarize a short newspaper article. ▪ Identify difference between terms found on a benefits handout, e.g., educational assistance and tuition aid benefits. ▪ Compare and contrast viewpoints in an editorial. 	
Literacy Area: Document	Level: Below Basic	Score: 0-204
Description of ability	May sometimes be able to written instructions on simple displays, e.g., charts figures, or forms); may sometimes be able to locate easily identified information or to enter basic personal information on simple forms; may be able to sign name in right place on form.	
Examples of NAAL tasks	<ul style="list-style-type: none"> ▪ Put a signature on a government form, e.g., Social Security card. ▪ Read a pay stub and identify the current net pay amount. 	
	Level: Basic	Score: 223-249

Description of ability	Is able to read, understand and follow one-step displays, e.g., government banking, and employment application forms, short newspaper articles or advertisements, television or public transportation schedules; able to locate and enter easily identifiable information that primarily involves making a literal match between the question and the display.
Examples of NAAL tasks	<ul style="list-style-type: none"> ▪ Identify a single piece of information on a document, e.g., the time when, or room number where, a meeting will take place. ▪ Using a television program listing to identify a television program that airs at a specific time on a specific channel. ▪ Record the name of a caller and caller's telephone number on a message slip.
Level: Intermediate Score: 250-334	
Description of ability	Is able to locate information in dense, complex displays, e.g., almanacs or other reference materials, maps and legends, government forms and instruction sheets, supply catalogues and product charts more complex graphs and figures that contains trends and multiple variables, when repeated cycling or re-reading is involved; able to make simple inferences about the information displayed; able to generate written responses that demonstrate these skills .
Examples of NAAL tasks	<ul style="list-style-type: none"> ▪ Identify a specific location on a map. ▪ Complete a bank deposit slip or check. ▪ Write the shipping information on a product order form. ▪ Make a decision based on information given in a schedule of events, e.g., television program listing.
Level: Advanced Score: 335-500	
Description of ability	Is able to integrate multiple pieces of information located in complex display; able to compare and contrast information, and to analyze and synthesize information from multiple sources; able to generate written responses that demonstrate these skills .
Examples of NAAL tasks	<ul style="list-style-type: none"> ▪ Locate specific information in an almanac, transportation timetable, utility bill, or television program listing. ▪ Interpret a display that utilizes multiple variables, e.g., a chart with blood pressure, age, and physical activity, compare information from two displays of data or transfer data from one display to another ▪ Use a map and flow directions to identify one or more changes in location ▪ Made a decision based on information given in a schedule of events where the time given is not written explicitly the schedule, e.g., a reader must infer that 8:15 am is between 8 am and 8:30 am

Literacy Area: Quantitative	Level: Below Basic Score: 0-234
Description of ability	May sometimes be able to perform simple arithmetic operations (primarily addition) in commonly used formats or in simple problems where the mathematical information is very concrete and familiar.
Examples of NAAL tasks	<ul style="list-style-type: none"> ▪ Calculate change in a situation involving money. ▪ Add two numbers on an order form or bank deposit slip.
Level: Basic Score: 235-289	
Description of ability	Is able to locate and use easily identifiable numeric information in simple texts or displays; able to solve one-step problems when the arithmetic operation is specified or easily inferred, the mathematical information is familiar and relatively easy to manipulate and the mathematical relationships are primarily additive.

