



Estimating Separation Rates

USD 259

January 2007

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Introduction

Estimating separation rates to evaluate changing population parameters and the effects on occupational structure has many important applications for Wichita USD259.

Understanding teachers' voluntary separation dynamics will aid personnel specialists in planning and quantifying their recruiting goals and provide information for development of strategies to retain experienced employees. This methodology examines occupational employment by age cohort and provides a forecast number of departures that can be anticipated over the next five years.

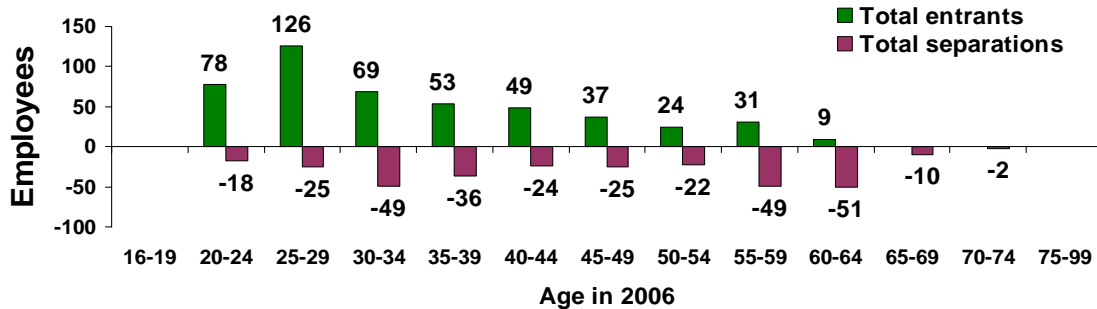
Concepts and definitions

To quantify and estimate labor force replacement needs, recent occupational employment behavior must be analyzed. The occupational labor force to be studied is divided into five-year age cohorts and employment entrants and departures are followed over time. Figure 1 illustrates the difference between total and net separations. For each age group, the figure shows total and net occupational entrants and separations for USD259 for the 2005-2006 school year. Younger age groups exhibit an excess of total entrants over total departures (separations) because a larger number of young people begin working in the education occupation than leave. This excess is referred to as net entrants. Likewise, the excess of total separations over total entrants in older age groups is referred to as net separations.

Net separations summarize movements of workers into and out of an occupation over a specific time. If employment is not declining, net separations approximate the number of persons who permanently leave an occupation: net separations quantify the need for new entrants and, if training is required, identify minimum training requirements.

Total separations identify the flow of individuals leaving an occupation for any reason, without regard to persons entering the occupation. Total separations are the larger measure of separations and represent total recruitment needs.

Figure 1. Total and Net Occupational Entrants and Separations, 2005–2006

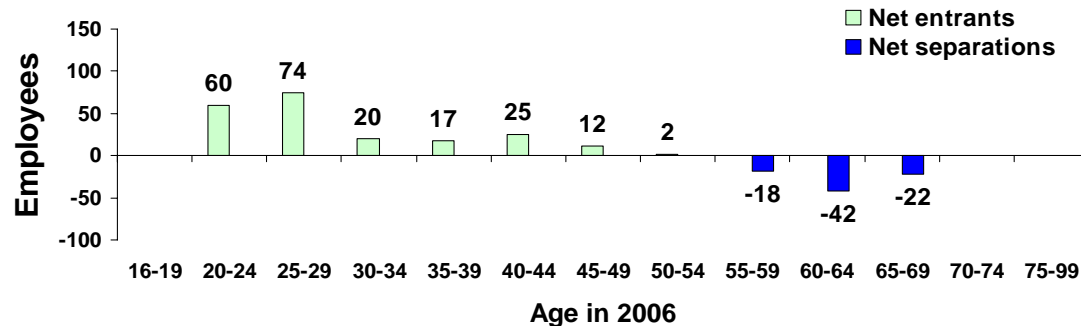


Total separations:

- Occur in all age groups
- Are independent of the total number of entrants
- Identify all of the normal movements out of occupations

Net separations:

- Occur only when total separations exceed total entrants within an age group
- For an occupation, are the sum of separations for each age group
- Exclude information about net entrants



Methodology

The Bureau of Labor Statistics (BLS) has developed a methodology to estimate net separation rates. The Center for Economic Development and Business Research applies the BLS methodology to local labor markets in order to estimate local replacement needs.¹

Producing net separation estimates requires longitudinal data that include occupational counts/census by age from two points of time. For example, occupational employment,

¹ *Occupational Outlook Handbook*. Chapter VI. Estimating Occupational Replacement Needs. Bureau of Labor Statistics, p 147-154. www.bls.gov/emp/optd/optd006.pdf.

by age, is prepared for a base year (2001) and for five years later (2006). Employment figures for each age group in the base year are then compared with employment figures for the group aged by five years. For instance, in a given occupation, employment in the base year for the 55- to 59-year-old group is compared with the employment five years later for the 60- to 64-year-old group. If employment has increased from the base year age group to the five-year-older age group, then the increase measures net entrants into the occupation for the cohort group, and net separations from the occupation for that age group are zero. If, instead, employment has declined from the base year age group to the five-year-older age group, the decline is recorded as net separations from that occupation for the cohort group. Separation ratios are calculated for each age cohort. The total net separation from the occupation is the sum of the net separations from that occupation for all age groups and can also be expressed as a ratio.

Estimates can be produced from national data using the Current Population Survey (CPS) or by applying the methodology to local employment demographics.

This study calculates both national separation rates by age cohort and local separation rates by age cohort. Both national and local separation rates are then applied to local employment data to determine a forecast range of net separations over the next five year period.

Source of Entrants or Separations

Reasons for movement into or out of an occupation vary and include retirement, employees changing occupations, competitive employment (for local statistics), employees leaving the labor force, unemployment, sickness and death. The change measured over the period in question thus reveals only whether there were more or fewer entrants than separation and tells nothing about the total entrants, total separations, or any of their components. That is, the change indicates whether the size of the original age group increased or decreased, but it indicates nothing about the specific actions of individuals making up the group.

Recruitment Rates and Separation Rates

It is important to distinguish between recruitment rates and separation rates. Recruitment rates that establish employment demand are based on total separations and additional demand for expansions (or less demand for contracting sectors). Net separation rates indicate that the size of the original age group decreased and are presumed to have permanently left the occupation. Net separations plus any additional demand for expansion identify the need for new entrants and if training is required, identify minimum training requirements.

Occupational Groups Studied

The study examines the following occupational groups:

- Teachers
 - Preschool and kindergarten teachers
 - Elementary and middle school teachers
 - Secondary school teachers
 - Special education teachers
- Janitors and building cleaners

Table 1. Summary Data, Wichita Public School System, USD259		
	2001	2006
All teachers, except post secondary	3,054	3,499
Preschool & kindergarten teachers	174	234
Elementary & middle school teachers	1,616	1,917
Secondary school teachers	662	736
Special education	507	503
Other instructors	95	109
Janitors & building cleaners	340	333

Occupational Subgroups with Age Cohort Distribution

Each occupational group is subdivided into age cohorts that range from 15 to 19 through 80 years and older. Employment data for 2001 and 2006 were obtained from USD259 and a forecast of net separations was calculated for the next five years (2007 through 2011).

Table 2. All Teachers, 2001 and 2006 by Age Cohort

(Includes all subgroups, counselors and other instructors)

USD259 Employees 2001			USD259 Employees 2006				
Age in 2001	Birth year	Number of Employees in age cohort		Age in 2006	Birth year	Number of Employees in age cohort	% in age cohort
15-19	1982-1986	0		20-24	1982-1986	184	5.3
20-24	1977-1981	130		25-29	1977-1981	476	13.6
25-29	1972-1976	425		30-34	1972-1976	462	13.2
30-34	1967-1971	376		35-39	1967-1971	443	12.7
35-39	1962-1966	397		40-44	1962-1966	454	13.0
40-44	1957-1961	379		45-49	1957-1961	437	12.5
45-49	1952-1956	464		50-54	1952-1956	476	13.6
50-54	1947-1951	500		55-59	1947-1951	458	13.1
55-59	1942-1946	289		60-64	1942-1946	91	2.6
60-64	1937-1941	82		65-69	1937-1941	14	0.4
65-69	1932-1936	11		70-74	1932-1936	3	0.1
70-74	1927-1931	1		75-79	1927-1931	1	0.0
75-79	1922-1926	0		80+	<1927	0	0.0
80+	<1922	0				3,499	100.0
		3,054					

Table 3. Preschool & Kindergarten Teachers, 2001 and 2006 by Age Cohort

USD259 Employees 2001			USD259 Employees 2006				
Age in 2001	Birth year	Number of Employees in age cohort		Age in 2006	Birth year	Number of Employees in age cohort	% in age cohort
15-19	1982-1986	0		20-24	1982-1986	19	8.1
20-24	1977-1981	14		25-29	1977-1981	40	17.1
25-29	1972-1976	29		30-34	1972-1976	38	16.2
30-34	1967-1971	21		35-39	1967-1971	31	13.2
35-39	1962-1966	24		40-44	1962-1966	26	11.1
40-44	1957-1961	19		45-49	1957-1961	26	11.1
45-49	1952-1956	21		50-54	1952-1956	30	12.8
50-54	1947-1951	25		55-59	1947-1951	20	8.5
55-59	1942-1946	16		60-64	1942-1946	4	1.7
60-64	1937-1941	5		65-69	1937-1941	0	0.0
65-69	1932-1936	0		70-74	1932-1936	0	0.0
70-74	1927-1931	0		75-79	1927-1931	0	0.0
75-79	1922-1926	0		80+	<1927	0	0.0
80+	<1922	0				234	100.0
		174					

Table 4. Elementary & Middle School Teachers, 2001 and 2006 by Age Cohort

USD259 Employees 2001			USD259 Employees 2006			
Age in 2001	Birth year	Number of Employees in age cohort	Age in 2006	Birth year	Number of Employees in age cohort	% in age cohort
15-19	1982-1986	0	20-24	1982-1986	122	6.4
20-24	1977-1981	81	25-29	1977-1981	287	15.0
25-29	1972-1976	264	30-34	1972-1976	266	13.9
30-34	1967-1971	217	35-39	1967-1971	257	13.4
35-39	1962-1966	211	40-44	1962-1966	252	13.1
40-44	1957-1961	198	45-49	1957-1961	232	12.1
45-49	1952-1956	230	50-54	1952-1956	237	12.4
50-54	1947-1951	236	55-59	1947-1951	222	11.6
55-59	1942-1946	138	60-64	1942-1946	36	1.9
60-64	1937-1941	37	65-69	1937-1941	5	0.3
65-69	1932-1936	4	70-74	1932-1936	1	0.1
70-74	1927-1931	0	75-79	1927-1931	0	0.0
75-79	1922-1926	0	80+	<1927	0	0.0
80+	<1922	0			1,917	100.0
		1,616				

Table 5. Secondary School Teachers, 2002 and 2006, by Age Cohort

USD259 Employees 2001			USD259 Employees 2006			
Age in 2001	Birth year	Number of Employees in age cohort	Age in 2006	Birth year	Number of Employees in age cohort	% in age cohort
15-19	1982-1986	0	20-24	1982-1986	35	4.8
20-24	1977-1981	27	25-29	1977-1981	95	12.9
25-29	1972-1976	86	30-34	1972-1976	99	13.5
30-34	1967-1971	72	35-39	1967-1971	79	10.7
35-39	1962-1966	98	40-44	1962-1966	103	14.0
40-44	1957-1961	68	45-49	1957-1961	82	11.1
45-49	1952-1956	91	50-54	1952-1956	97	13.2
50-54	1947-1951	126	55-59	1947-1951	116	15.8
55-59	1942-1946	69	60-64	1942-1946	24	3.3
60-64	1937-1941	21	65-69	1937-1941	5	0.7
65-69	1932-1936	4	70-74	1932-1936	1	0.1
70-74	1927-1931	0	75-79	1927-1931	0	0.0
75-79	1922-1926	0	80+	<1927	0	0.0
80+	<1922	0			736	100.0
		662				

Table 6. Special Education Teachers, 2001 and 2006, by Age Cohort

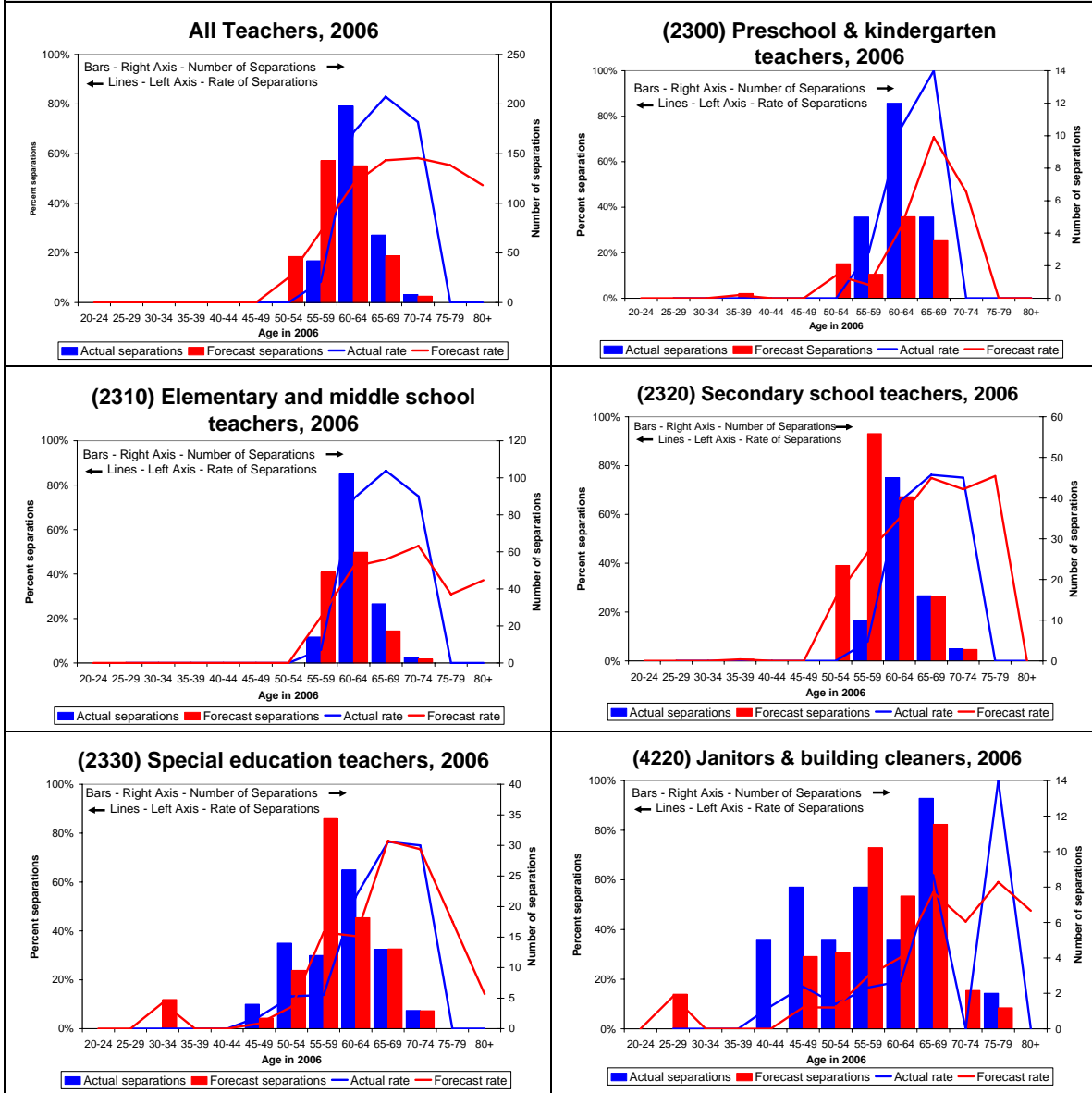
USD259 Employees 2001			USD259 Employees 2006			
Age in 2001	Birth year	Number of Employees in age cohort	Age in 2006	Birth year	Number of Employees in age cohort	% in age cohort
15-19	1982-1986	0	20-24	1982-1986	8	1.6
20-24	1977-1981	8	25-29	1977-1981	49	9.7
25-29	1972-1976	45	30-34	1972-1976	53	10.5
30-34	1967-1971	56	35-39	1967-1971	64	12.7
35-39	1962-1966	55	40-44	1962-1966	57	11.3
40-44	1957-1961	81	45-49	1957-1961	77	15.3
45-49	1952-1956	106	50-54	1952-1956	92	18.3
50-54	1947-1951	87	55-59	1947-1951	75	14.9
55-59	1942-1946	48	60-64	1942-1946	22	4.4
60-64	1937-1941	17	65-69	1937-1941	4	0.8
65-69	1932-1936	4	70-74	1932-1936	1	0.2
70-74	1927-1931	0	75-79	1927-1931	1	0.2
75-79	1922-1926	0	80+	<1927	0	0.0
80+	<1922	0			503	100.0
		507				

Table 7. Janitors and Building Cleaners, 2001 and 2006, by Age Cohort

USD259 Employees 2001			USD259 Employees 2006			
Age in 2001	Birth year	Number of Employees in age cohort	Age in 2006	Birth year	Number of Employees in age cohort	% in age cohort
15-19	1982-1986	11	20-24	1982-1986	34	10.2
20-24	1977-1981	15	25-29	1977-1981	28	8.4
25-29	1972-1976	23	30-34	1972-1976	24	7.2
30-34	1967-1971	36	35-39	1967-1971	36	10.8
35-39	1962-1966	55	40-44	1962-1966	50	15.0
40-44	1957-1961	47	45-49	1957-1961	39	11.7
45-49	1952-1956	50	50-54	1952-1956	45	13.5
50-54	1947-1951	48	55-59	1947-1951	40	12.0
55-59	1942-1946	26	60-64	1942-1946	21	6.3
60-64	1937-1941	21	65-69	1937-1941	8	2.4
65-69	1932-1936	5	70-74	1932-1936	5	1.5
70-74	1927-1931	2	75-79	1927-1931	0	0.0
75-79	1922-1926	0	80+	<1927	0	0.0
80+	<1922	1			330	100.0
		340				

Local separation rates were calculated and compared to national trends. In general, USD259 delays teacher separations compared to national trends, but once separations occur, they are more concentrated than the national trend.

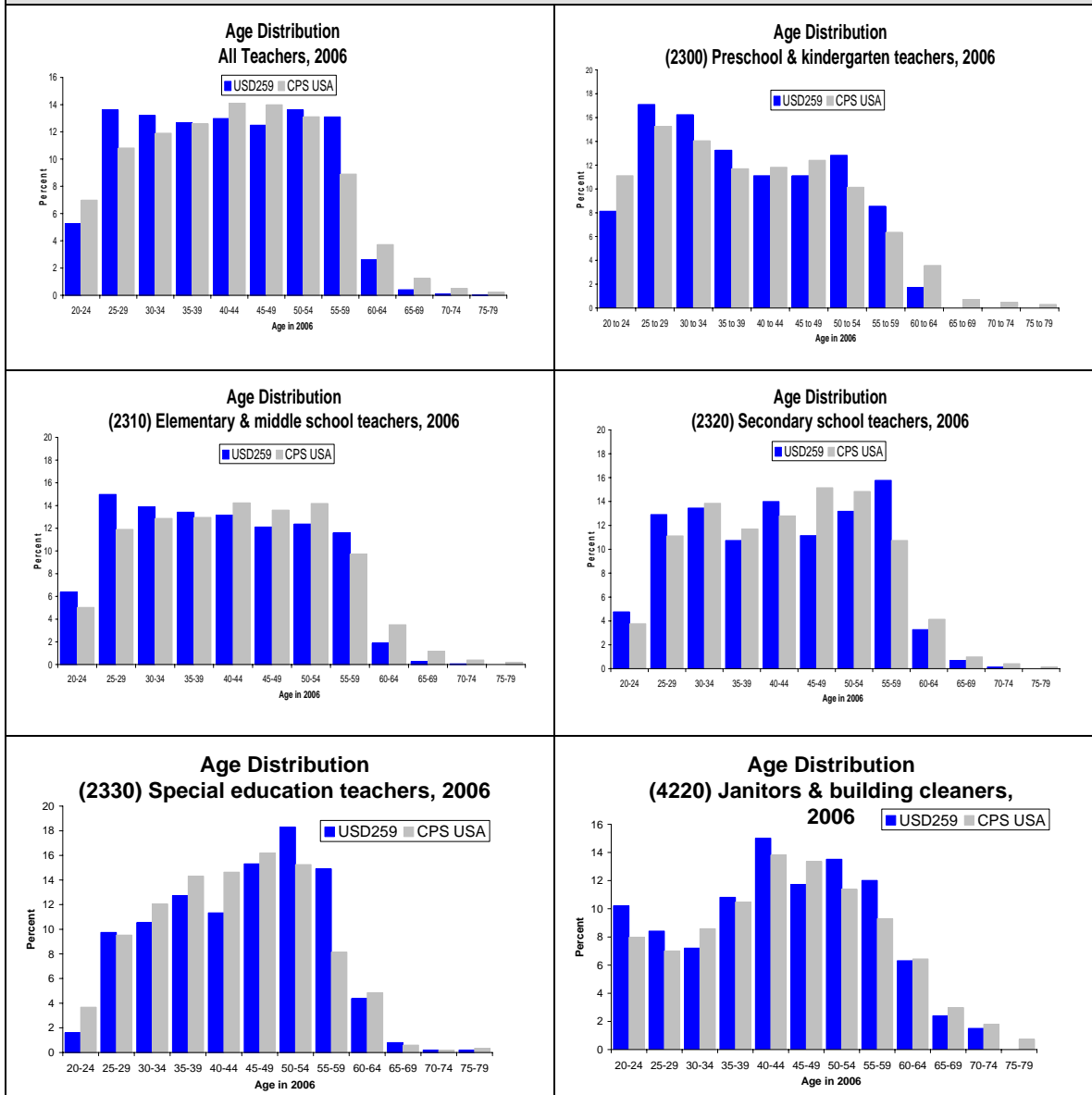
Table 8. Actual Separation and Forecast Separations, 2006



Age Distribution: USD259 Distribution vs. National Distribution

The impact of net separation is getting additional attention due to the aging of the labor force as the baby boomers reach retirement age. The following graphs illustrate the Wichita Public School System's teacher age distribution versus the national teacher age distribution.

Table 9. Age Distribution: USD259 and National



Special education teachers and secondary education teachers have distributions that are likely to result in accelerating separations over the next decade.

Forecast Net Separations 2007 through 2011

Forecast net separations for Wichita Public School System have been calculated using the local USD259 data and national CPS data.

Occupational Group	USD259 Separation Rates	CPS Separation Rates
All teachers	425.8	432.4
Preschool & kindergarten teachers	25.0	14.0
Elementary & middle teachers	209.3	165.1
Secondary teachers	105.4	154.8
Special education teachers	86.1	98.5
Janitors & building cleaners	48.9	51.2

A more detailed table with estimates by occupation and age cohort can be found in the appendix.

Demand for New Entrants – All Teachers

The occupational demand for new teachers is the sum of separations plus occupational growth. The USD259 annual demand for teachers is forecast to be between 85 and 86 teachers per year between 2007 and 2011.

The teaching occupation demand is forecast to continue to grow throughout the forecast period. According to the 2012 Kansas Occupational Outlook, published by the Kansas Department of Labor (KDL), elementary school teachers are among the fastest growing occupations in the state. The KDL forecast that between 2002 and 2012 South Central Kansas will add 740 additional elementary school teacher jobs.² The KDL does not provide additional projections for other types of teachers (middle school, secondary school and special education).

To estimate additional demand for USD259, the study evaluated the recent growth of teacher employment and assumed growth would continue at the same rate. In 2001, USD259 reported 3,054 teachers and in 2006, 3,499 teachers. This represents a 14.57 percent annual increase or approximately 89 teachers per year average growth.

Therefore, the occupational demand for new teachers is the sum of annual separations forecast at approximately 85 teachers and annual occupational growth forecast at 89 teachers per year.

² *Kansas Occupational Outlook 2012 – Executive Summary*. Published April 2006, p. 32.
<http://laborstats.dol.ks.gov/occupatn/oo2012/oo2012.htm>.

Table 11. Demand for New Entrants – All Teachers (Annual Average)	
Separations	85.2
Occupational growth	+ 89.0
Estimated demand for new entrants	174.2

Supply of New Entrants – All Teachers

New entrants into the teaching profession can be estimated by examining the number of newly licensed teachers from college. According to the Kansas State Department of Education’s Licensed Personnel Report, 1,734 new teachers were licensed in 2005-2006.³

The U.S. Census Bureau’s American Community Survey estimates that 11.2 percent of the state’s publicly educated students attend USD259. Therefore, if the newly licensed teachers from college are proportioned to USD259 by this percentage, 194 new teachers would likely be available for employment by the district.

The Licensed Personnel Report also identified a significant issue with retention of new teachers. According to the report, the new teacher retention rate is 69.7 percent with a mentor and 52.5 percent without a mentor.⁴ Therefore, of the 194 new teacher proportioned to USD259, it is likely that only 102-135 teachers will be retained after one year of employment.

Table 12. Supply of New Entrants – All Teachers (Annual Average)	
New Teachers from college (2005-2006)	1,734
Proportioned to USD259	x 11.2%
New teachers potentially allocated to USD259	194
Retention after 1 year	
With mentor (69.7%)	135
Without mentor (52.5%)	101.8

Tight Labor Market for Teachers

The supply and demand dynamics illustrate a tight market for teachers over the forecast period. Occupational shortages are a likely outcome.

³ *Licensed Personnel Report, State Profile 2005-2006*. Kansas State Department of Education, Teacher Education and Licensure.

http://www.ksde.org/LinkClick.aspx?link=Licensure%20Documents/2006_LPR.pdf&tabid=322.

⁴ Ibid.

Table 13. Demand and Supply – All Teachers, 2007 through 2011 (Annual Average)			
Estimated Supply		Estimated Demand	
Newly licensed teacher potentially allocated to USD259	194.0	Separations	85.2
After 1 year, with mentor	135.0	Occupational growth	+ 89.0
After 1 year, without mentor	101.8	Estimated demand for new entrants	174.2

Strategies to Manage Tight Labor Markets

USD259 and other Kansas school districts will be competing for licensed educators to meet their growing demand.

Possible supply-side strategies to manage tight labor markets include delaying separations of current employees through incentives in income or retirement options. Another strategy may be to reduce the leakage of newly licensed through quality mentoring or student-loan payoff programs with increasing contributions based on continued employment. A third strategy would be for USD259 to recruit a larger proportion of the newly licensed teachers than the normal distribution forecast in this model. Teachers can also be encouraged to migrate to Kansas. This strategy would simply redistribute the tight labor market to other parts of the state or nation. A final strategy necessary to reduce the tension in the occupational labor market would be to educate, license, employ and retain a greater number of teacher candidates each year.

Structural changes in education may result in occupational demand-side reductions. These changes might include distance learning, on-line instruction, or larger classroom size.

These are only a few strategies under consideration in U.S. schools and each of these suggestions has drawbacks and complications. Labor force shortages are forecast to become evident in numerous occupations as the baby boomers move into retirement.

Limitations of the Methodology

National separation rates are calculated using the Current Population Survey (CPS). The CPS is conducted primarily to obtain current data on the labor force status of individuals and is not specifically designed to obtain information for analysis over time. Individuals may respond differently to the same CPS question about their occupation; some individuals may provide the interviewer with a detailed description of their occupation

and other individuals may provide a less detailed description. An interviewer or computer processors interpret and code the responses introducing additional judgments and error. Occupations with fewer than 50,000 employees provide for small sample size, and statistical inferences from small samples are unreliable.

Local separation rates are calculated with the same methodology as the national separation rates. Additional concerns arise when allocating employees to occupational groups in the same manner as the CPS. Furthermore, local dynamics such as local retirement options and local labor market competition may cause the local separation rates to vary from the national rates.

The Center would like to thank David Wright Ph.D., Associate Professor of Sociology, Wichita State University for CPS estimates.