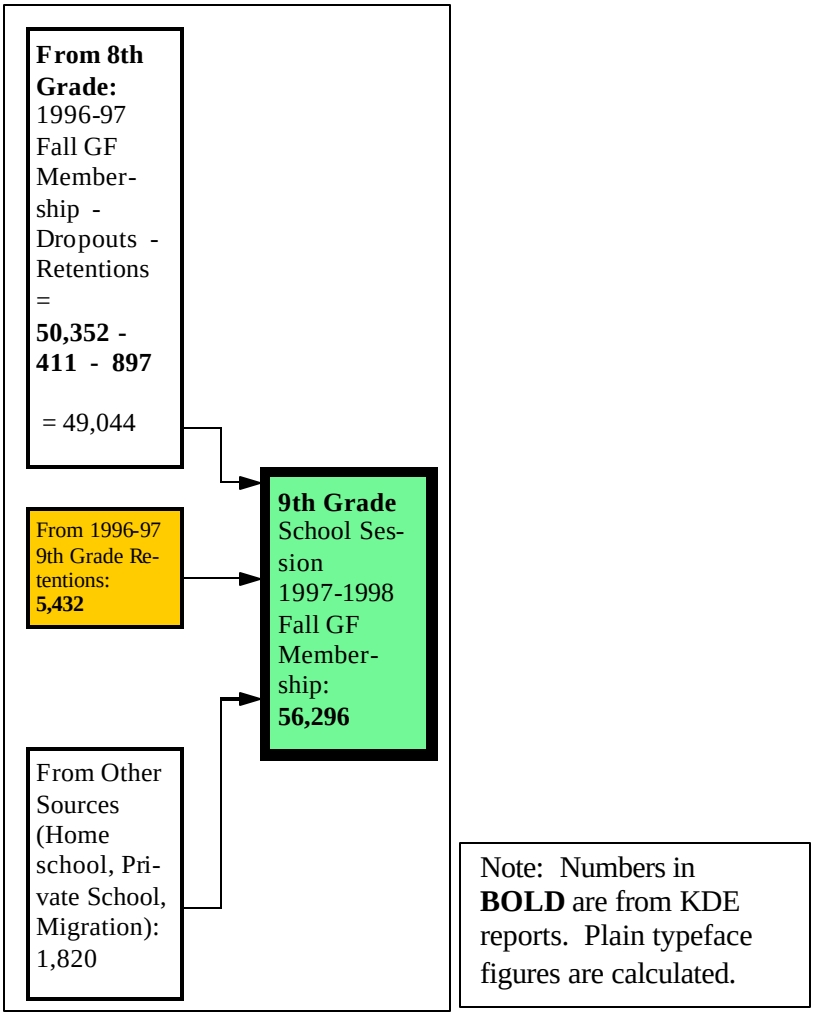
Examination of The KDE Statistics for the Class of 1999 to 2002

The Kentucky Department of Education (KDE) produces a number of nonacademic data each year including membership (enrollment) counts, dropout figures, graduation figures, and the number of students held back in grade at the end of each school year (called 'Retentions' in Kentucky). This paper develops a flow model that should provide fairly balanced agreement between these data. However, it will be shown that the data cannot be balanced without the introduction of thousands of extra unknown student losses which must be added to the officially reported dropout figures. These unknown losses are very likely additional dropouts that are not captured by the Department of Education's reporting program.

CONSTRUCTING A COHORT FLOW MODEL

To begin, consider Figure 1, which shows a number of different pieces of data from KDE. The data presented here concern the Kentucky public high school Class of 2001 during its transition from 8th grade to 9th grade.

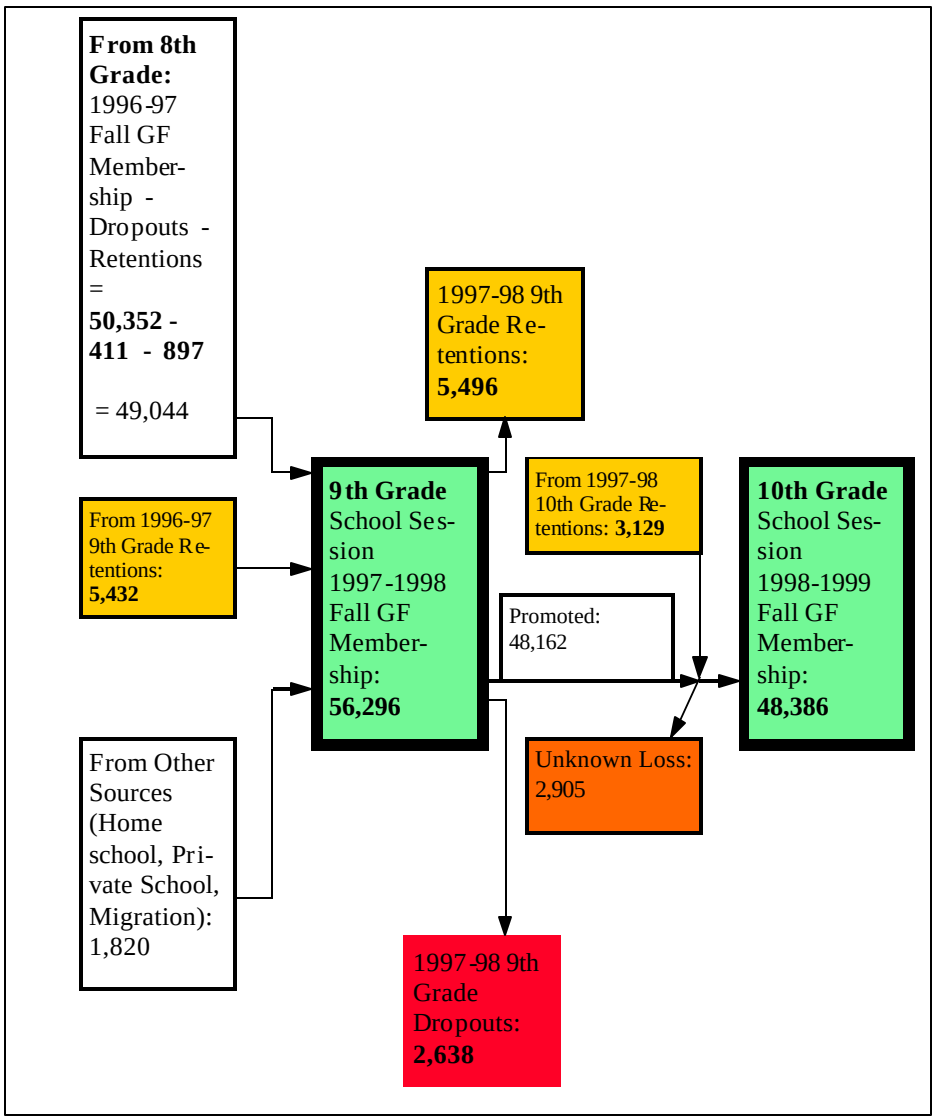
Figure 1.
Inputs to the 9th Grade Year for the Graduating Class of 2001



The graduating Class of 2001 was in 9th grade in the 1997-98 school year. According to KDE's Fall Growth Factor Ethnic/Membership Reports, the 9th grade class of 1997-98 had a fall membership of 56,296 students. This group included 49,044 students who came from the previous year's 8th grade class (calculated by taking the 8th grade fall membership from one year earlier and subtracting the 8th grade dropouts and retentions that occurred at the end of that year as listed in KDE's Nonacademic Data Briefing Packet for 1993 to 2001, dated July 8, 2002). The 1997-98 grade 9 fall membership also included 5,432 students who were retained from the previous year's 9th grade class. In addition, to make up the total fall 9th grade membership, it appears another 1,820 students must have come from other sources such as home schooling, private schools (Kentucky has a number of private schools that offer no services after grade 8) and possible migration into the state from other parts of the country.

Now, consider what happened at the end of the Class of 2001's 9th grade year, as depicted by the added information in Figure 2.

Figure 2.
Adding the Changes to the Class of 2001 Between 9th Grade and 10th Grade



At the end of the Class of 2001's 9th grade year, the entering membership of 56,296 students split into several different subgroups. A portion of the students (2,638) officially became dropouts according to the KDE Nonacademic Data Report cited earlier. Another portion (5,496 students) was retained (held back) in 9th grade for the following year. That implies that 56,296 minus 2,638 minus 5,496, or 48,162 students should have been promoted to 10th grade. In addition, there were 3,129 students that KDE reported were retained from the previous year's 10th grade class. These students should also have made up a part of the fall membership for the 10th grade class of 1998-99. So, one would expect the fall 10th grade membership in 1998-99 to number 48,162 plus 3,129, or 51,291 students. But, the actual fall membership that year according to the KDE Fall Growth Factor Ethnicity Report was much lower, only 48,386 students. The difference is substantial, 2,905 students. The missing students are an 'Unknown Loss.'

Similar problems occur for the Class of 2001 throughout the rest of their school years, as shown in Figure 3. To make the KDE data balance, additional Unknown Losses of 1,464 students between the sophomore to junior year and 1,308 students between the junior and senior year are required. These students are not covered by the reported dropouts or by the officially reported retentions. The missing students are not promoted to the next grade, either. Over the course of the Class of 2001's high school years, a total unknown loss of 5,677 students has occurred.

EXPLANATIONS FOR THE UNKNOWN LOSS OF 5,677 STUDENTS

Kentucky allows students to graduate early, and about 1,000 students a year apparently do so. This can be seen in the right-most set of blocks in Figures 3 to 6. The Apparent Earl y Graduates for the Class of 2001, for example, are calculated as follows: A mathematical solution for the number of possible graduates would be only 35,788 while the actually reported number of graduates is higher at 36,957. The difference is 1,169 students. They apparently graduated from other cohorts and were not originally members of the Class of 2001. Corresponding early graduates in 2000 number 711 and in 1999 early graduates numbered 954 as can be seen in Figures 4 and 5. It is unknown if KDE data contains enough detail to support assigning a source cohort graduation year group to these early graduates. Likewise, it is also unknown how many graduates in former years actually started as part of the Class of 2001 but then graduated early. In any event, early graduates help explain only a small portion of the total Unknown Loss.

In the case of the Class of 2001, a loss of about 4,500 students, or 8 percent of the total class, remains unaccounted for in KDE's statistics package. Unknown losses are summarized in Table 1 for all the graduation years included in this study.

Table 1.
Unknown Loss Summary

Graduation Year	Total Unknown Loss Between 9th and 12th Grade	Apparent Early Graduations	Estimated Remaining Unknown Loss
1999	4,243	954	3,289
2000	5,369	711	4,658
2001	5,677	1,169	4,508
2002	4,008	1,168	2,840

Are the Estimated Remaining Unknown Loss students transfers out of state? Membership changes for lower grades imply no such migration is taking place. As shown in Table 2, average changes in enrollment across grades 4 to 8 are very small, indicating that very little migration occurs in Kentucky. It would be unreasonable to expect that very high migration is occurring only in the high school years. However, the high losses in the high school years, with the exception of the 8th grade to 9th grade transitions, are dramatic. The anomaly in the grade 8 to 9 transition results from the high number of students retained in 9th grade at the end of each year.

Table 2.
Fall Membership in Kentucky Public Schools and Cohort Changes From Year to Year

	1997-98	*Change*	1998-99	*Change*	1999-2000	*Change*	2000-01	*Change*	2001-02
	GRAND	*Grade x to*	GRAND	*Grade x to*	GRAND	*Grade x to*	GRAND	*Grade x to*	GRAND
GRADE	TOTAL	*Grade x + 1*	TOTAL	*Grade x + 1*	TOTAL	*Grade x + 1*	TOTAL	*Grade x + 1*	TOTAL
EL	47,607		46,420		46,059		46,146		45,910
P	152,914		152,648		151,621		148,400		146,768
04	46,654		48,268		49,656		49,898		49,397
05	47,106	-392	46,262	287	48,555	-514	49,142	-1	49,897
06	47,639	556	47,662	1,099	47,361	304	48,859	990	50,132
07	49,984	450	48,089	935	48,597	217	47,578	378	49,237
08	49,501	-985	48,999	-218	47,871	-1,005	47,592	-255	47,323
09	56,296	5,242	54,743	6,550	55,549	6,008	53,879	6,458	54,050
10	49,205	-7,910	48,386	-7,776	46,967	-7,572	47,977	-6,613	47,266
11	43,876	-6,021	43,184	-5,390	42,996	-5,551	41,416	-5,505	42,472
12	39,869	-4,862	39,014	-4,342	38,842	-4,600	38,396	-3,912	37,504
EC	6,908		6,976		2,756		5,874		5,727
Total	637,559		630,651		626,830		625,157		625,683
G9 to G12 Total Membership	189,246		185,327		184,354		181,668		181,292
Average Change Per Year G4 to G8		-93		526		-250		278	

Notes to Table 2.

1. Data Source for membership columns are Fall Growth Factor/Ethnic Membership Reports from KDE.
2. Change columns calculated.
3. Example of tabulation is shown by the arrows. The grade 4 cohort in the 1997-98 school year numbered 46,654 students. One year later, this cohort numbered 46,262 in the fall of their 5th grade year. The change is –392 students.

Thus, it does not seem likely that the unknown losses are caused by transfers out of state to other school systems.

Are these unknown loss students transfers to home schools or private schools? KDE's enrollment numbers for both of these alternative education possibilities makes this unlikely. However, if such large transfers from public to private schools do occur during the high school years, policy makers should have data advising them of this important situation.

Are these unknown students actually dropouts? Unfortunately, this appears to be the most likely explanation, and the implications for Kentucky's reported dropout data are significant. Errors in the KDE reported numbers of dropouts could run from 32 percent to about 50 percent. If this is correct, a number of high schools that earned rewards under the CATS program probably didn't deserve them.

Table 3.
Estimated Remaining Unknown Loss Compared to the Reported Dropouts

Graduation Year	Reported Dropouts For Class Per KDE	Estimated Remaining Unknown Loss	Possible Percentage Error (Column 3 / 2)
1999	10,095	3,289	32.6%
2000	9,371	4,658	49.7%
2001	9,409	4,508	47.9%
2002	8,688	2,840	32.7%

Data Source: Reported Dropouts computed from KDE annual non-academic reports. Sums for a given graduating class are computed across four years, e.g. for the Class of 1999 the reported dropouts are the sum of the 9th grade dropouts for 1995-96 plus the 10th grade dropouts from 1996-97 plus the 11th grade dropouts from 1997-98 plus the 12th grade dropouts for 1998-99.
Estimated Remaining Unknown Loss from Table 2.

Clearly, there is disturbing evidence that Kentucky's reported dropout data are questionable. More research is necessary to develop a complete picture of this situation.

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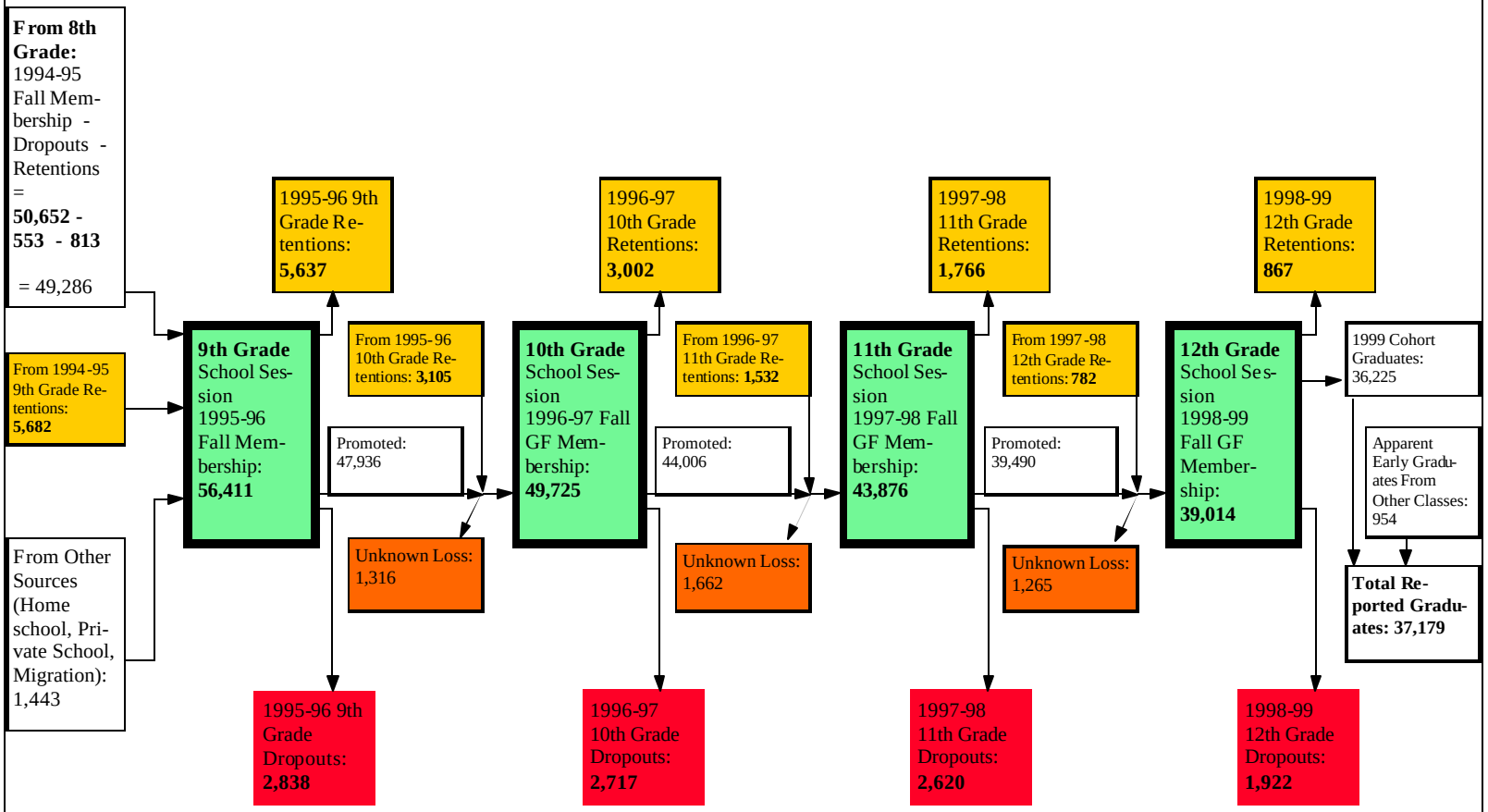
Figure 3.

Kentucky Class of 1999 Dropout/Retention/Unknown Loss Flow Chart

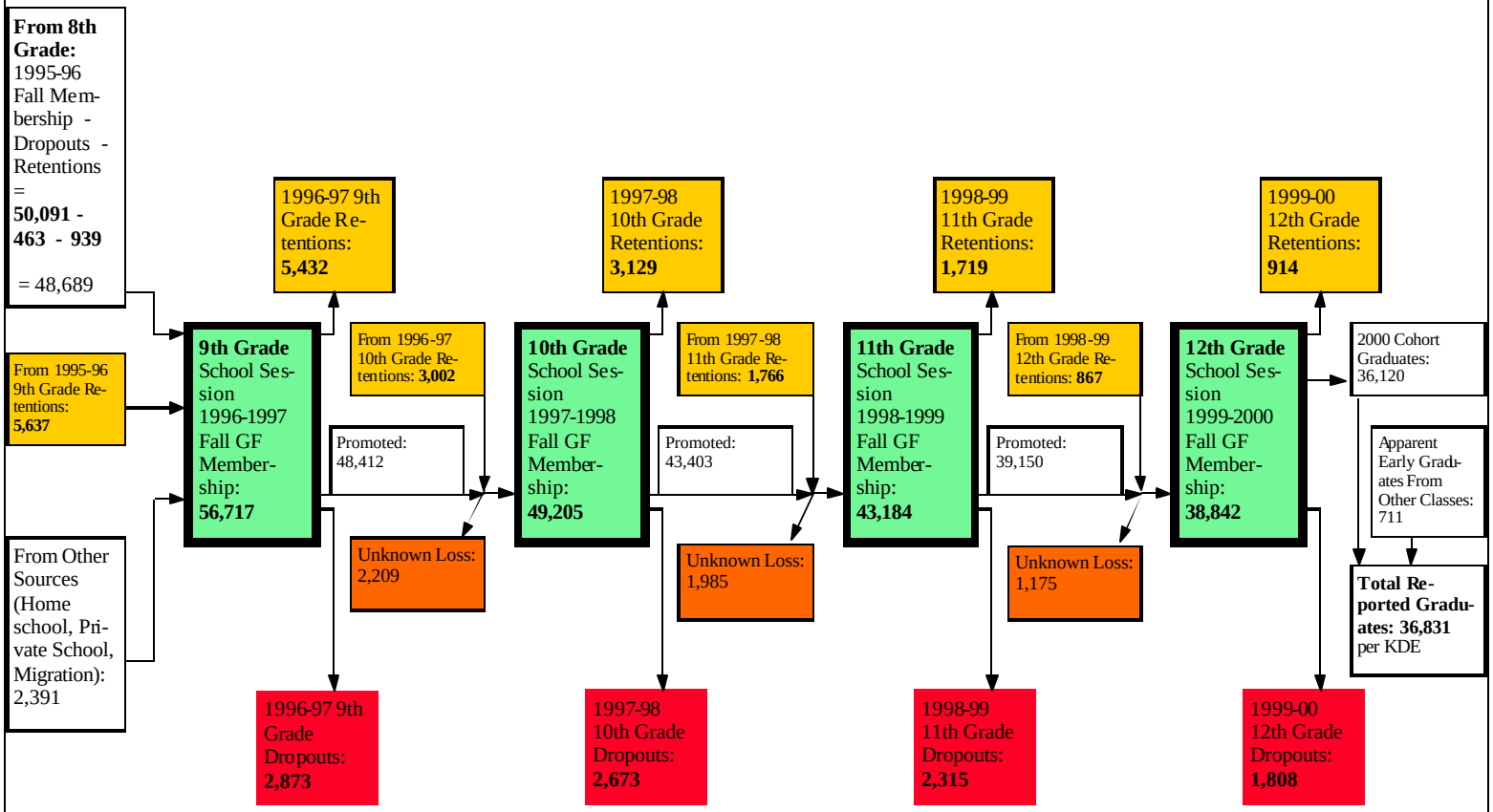


Total Unknown Loss for Class of 1999 = 1,316 + 1,662 + 1,265 = 4,243
Total dropouts for Class of 1999 from 9th grade entry to graduation = 2,836 + 2,717 + 2,620 + 1,922 = 10,095
Total retentions for Class of 1999 = 5,637 + 3,002 + 1,766 + 867 = 11,272
Class of 1999 9th Grade Fall Membership - Total Dropouts = 56,411 - 10,095 = 46,316. But, on a continuing basis, we are only graduating about 36,000 to 37,000 students.
GF is Growth Factor from Growth Factor Ethnicity Reports. Older SD-125R Fall Membership Reports were phased out after 1997-98.

Numbers in Bold From KDE. Plain text numbers calculated to make results balance.

Figure 4.

Kentucky Class of 2000 Dropout/Retention/Unknown Loss Flow Chart



Total Unknown Loss for Class of 2000 = 2,209 + 1,985 + 1,175 = 5,369
Total dropouts for Class of 2000 from 9th grade entry to graduation = 2,873 + 2,673 + 2,315 + 1,510 = 9,371
Total retentions for Class of 2000 = 5,432 + 3,129 + 1,719 + 914 = 11,194
Class of 2000 9th Grade Fall Membership - Total Dropouts = 56,717 - 9,371 = 47,346. But, on a continuing basis, we are only graduating about 36,000 to 37,000 students.
GF is Growth Factor from Growth Factor Ethnicity Reports. Older SD-125R Fall Membership Reports were phased out after 1997-98.

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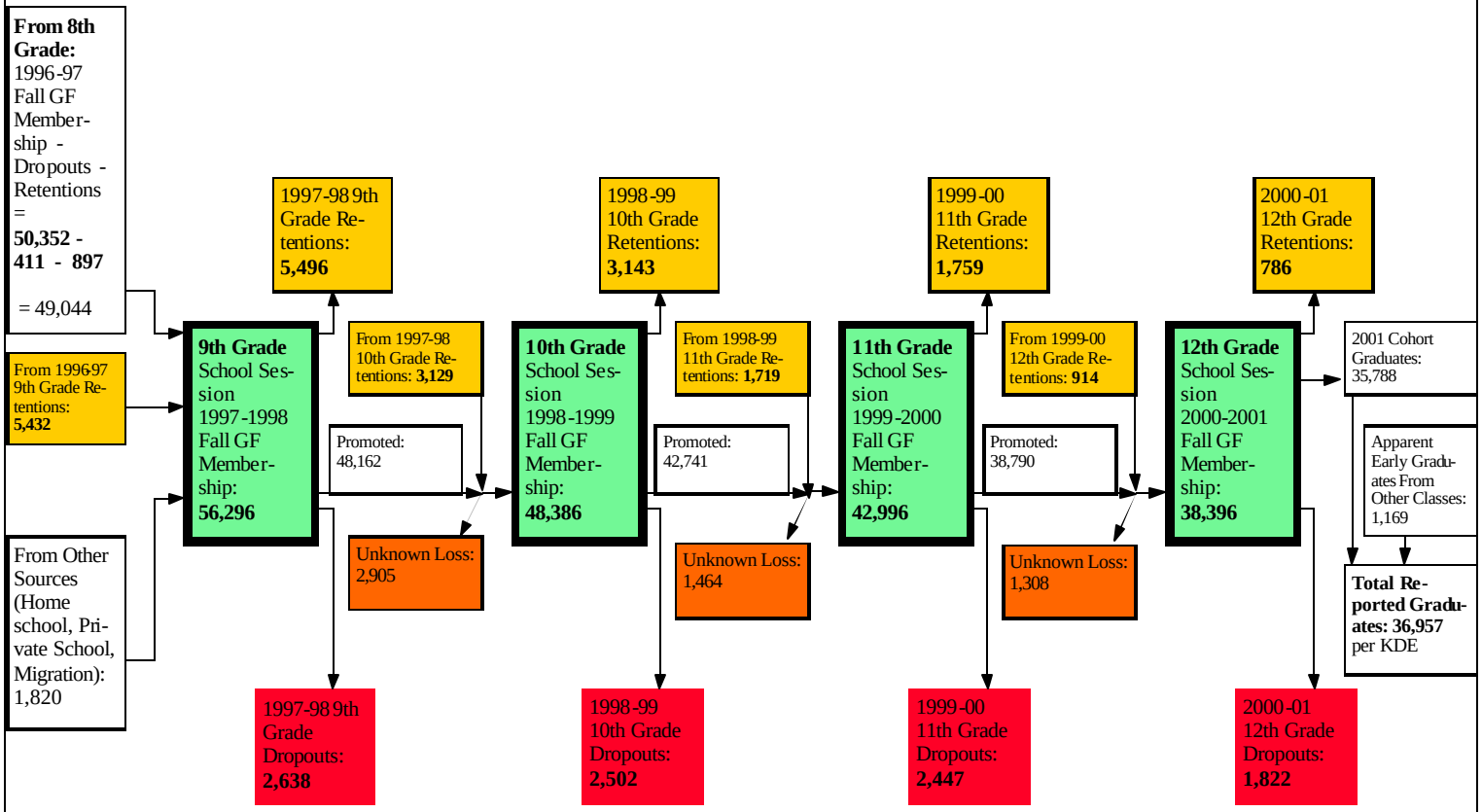
Figure 5.

Kentucky Class of 2001 Dropout/Retention/Unknown Loss Flow Chart

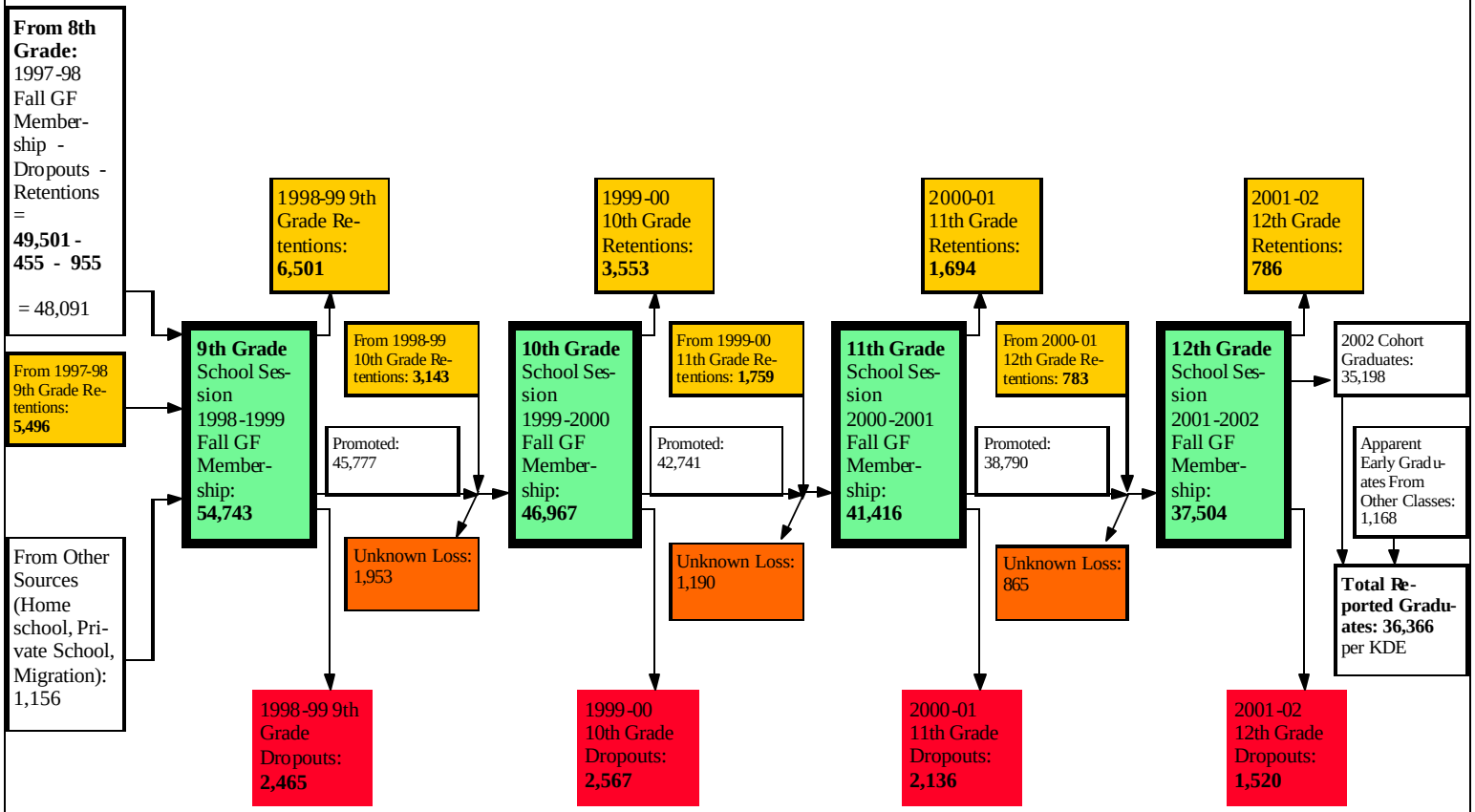


Total Unknown Loss for Class of 2001 = 2,905 + 1,464 + 1,308 = 5,677
Total dropouts for Class of 2001 from 9th grade entry to graduation = 2,638 + 2,502 + 2,447 + 1,822 = 9,409
Total retentions for Class of 2001 = 5,496 + 3,143 + 1,759 + 786 = 11,184
Class of 2001 9th Grade Fall Membership - Total Dropouts = 56,296 - 9,409 = 46,887. But, on a continuing basis, we are only graduating about 36,000 to 37,000 students.
GF is Growth Factor from Growth Factor Ethnicity Reports. Older SD-125R Fall Membership Reports were phased out after 1997-98.

Numbers in Bold From KDE. Plain text numbers calculated to make results balance.

Figure 6.

Kentucky Class of 2002 Dropout/Retention/Unknown Loss Flow Chart



Total Unknown Loss for Class of 2002 = 1,953 + 1,190 + 865 = 4,008
Total dropouts for Class of 2002 from 9th grade entry to graduation = 2,465 + 2,567 + 2,136 + 1,520 = 8,688
Total retentions for Class of 2002 = 6,501 + 3,553 + 1,694 + 786 =12,534
Class of 2002 9th Grade Fall Membership - Total Dropouts = 54,743 - 8,688 = 46,055. But, on a continuing basis, we are only graduating about 36,000 to 37,000 students.
GF is Growth Factor from Growth Factor Ethnicity Reports. Older SD-125R Fall Membership Reports were phased out after 1997-98.

Numbers in Bold From KDE. Plain text numbers calculated to make results balance.