COLORADO
Department of Education

Technical Advisory Panel Meeting

September 20, 2018

Technical Advisory Panel

- Welcome!
- Introductions

COLORADO
Department of Education

Growth-to-Standard: Update

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September 20, 2018

Topics to Cover

- Recap Growth-to-Standard conversation from last spring
- Look at SGP distributions by observed achievement level trajectories
- Look at Target Growth Percentiles
- Look at Data for Hypothetical Catch Up Determinations
- Comparison of 2017 Future Year 1 Targets to 2018 Observed Outcomes

Recap From Last Spring

Growth-to-Standard Approach 1:

- Long term focus on Level 4 i.e. “Meeting Grade Level Expectations” and getting all students College and Career Ready by graduation.
- Student trajectory determined by initial performance level and distance to Level 4 (or maintaining Level 4 if already there).
- Trajectory would be held constant (i.e. not reset each year) and progress would be gauged towards attaining Level 4 (aligns with ELP methodology required by ESSA).
- Once Level 4 or above attained, student would be expected to maintain Level 4 for all subsequent years.

Recap From Last Spring

- The proportions of students moving up in 1, 2, 3, and 4-years varies by content grade level and starting achievement level, but in general a fairly low (40-60%) of students are on track to move up one or more achievement levels.
- Maintaining these gains is quite difficult with nearly half of all students dropping back down to their original proficiency level at some point during the next 4 years.

Recap From Last Spring: Appro

Pros	• Keeps focus on students meeting and then maintaining grade level/college & career readiness standards regardless of teacher/school/district changes • Consistent target across all students and schools
Cons	• Could incentivize schools to work with students who are "closer" to meeting grade level/college & career readiness standards • Extremely ambitious and will be very rare for level 1 and 2 students, worry that metric will become meaningless and/or discouraging
Consider-ations	• Can high FRL/mobility schools do well on this measure? If not, don't use. • Would require existence proof to show that all students have the opportunity to reach grade level/college & career readiness standards • How would we communicate baseline year and each student's established trajectory for reaching grade level/college & career readiness standards?

Recap From Last Spring

Growth-to-Standard Approach 2:

- Stepping stone approach that gives students credit for moving up one or more performance levels within a given time frame.
- Student trajectory determined by initial performance level and distance to next level (or maintaining Level 4 if already meeting expectations).
- Trajectory would reset each year and progress would be gauged towards attaining the next performance level (aligns with previous Catch-Up/Keep-Up methodology).
- Once Level 4 or above attained, student would be expected to maintain Level 4 for TBD timeframe.

Recap From Last Spring: Appro

Pros	• Emphasizes the gains over the course of a year, rather than solely focusing on did students hit the minimum expectation for a grade level. • Resetting the clock acknowledges each school year as an independent learning instance and gives credit in the frameworks for the progress/contribution of that year/teacher/school
Cons	• Focus on reaching next proficiency level rather than grade level/college & career readiness standards • Can create unrealistic expectation of how often student expects to move up • Doesn't measure whether students are making consistent progress
Consider-ations	• Only realistic if evidence based targets are set, as regards the # of years of students take to move up and when they stop • Is there a way to think about "percentile improvement" such that you capture improvement even if not between levels? Caveat is that you would have to define "meaningful improvement“ • How do we support educators and leaders to understand the clock gets reset every year? How do we help school staff wrap their heads around evaluating the service models for students with a constantly changing bar?

Growth-to-Standard Requirem

- According to 22-11-203(1)(a), CDE will calculate "what will constitute adequate longitudinal adequate growth for each student for that school year in each subject that is included in the statewide assessments… (b) The department shall use data available for longitudinal analysis to review and revise the calculation of adequate longitudinal growth as necessary"
- Required performance indicator for inclusion in annually-determined school and district rating calculations: "Student academic growth to standards, based on students progress toward meeting the state standards… or for students who meet grade-level expectations on the state standards, progress toward higher levels of achievement, if available, as measure by the statewide assessments." 22-11-204(1)(a)(III)

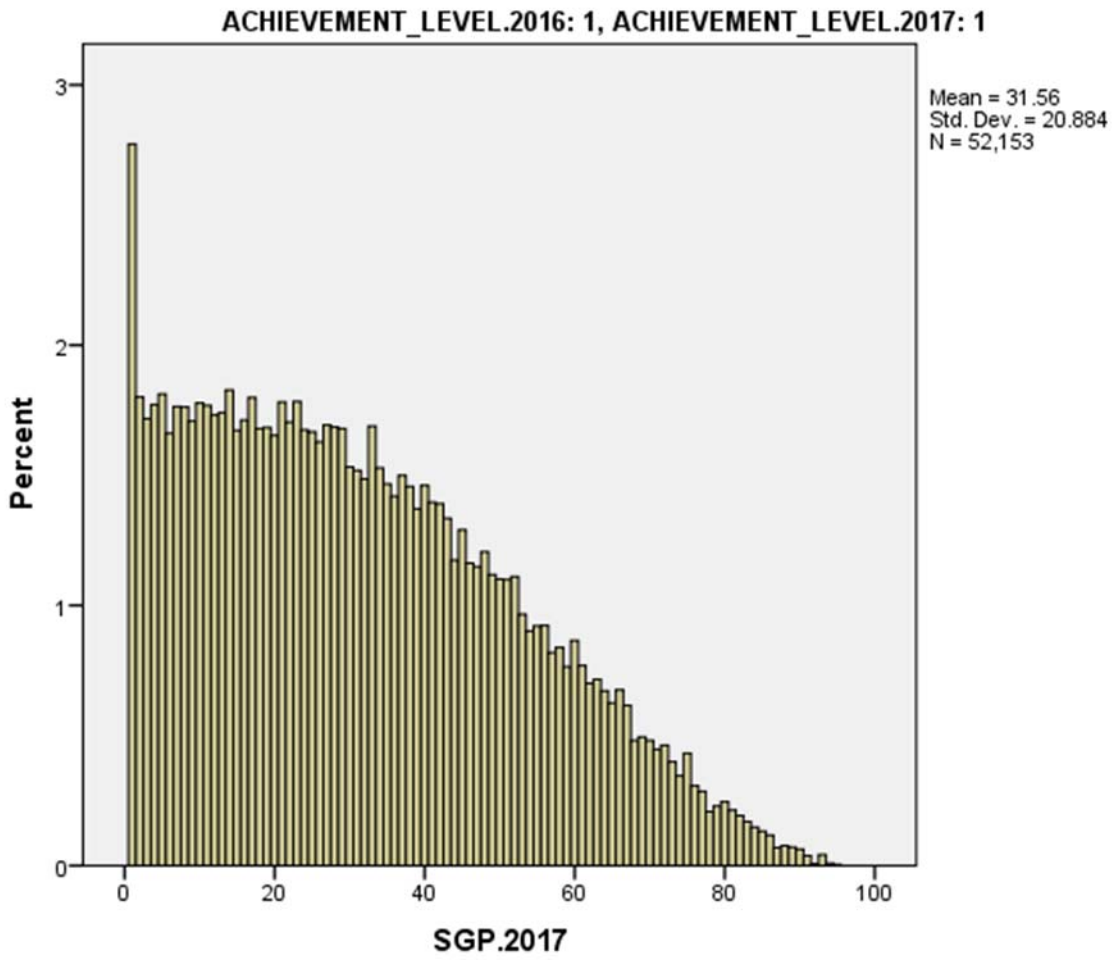
SGP Distributions for Observed Achievement Level Trajectories

2017 Observed Achievement L

- Eligible for inclusion in the following analyses were 555,461 students in grades 3-8 with typical grade progressions and CMAS scores for both 2016 and 2017
- The table below shows the proportion of students scoring at each of the 5 CMAS achievement levels in 2016

		Count	Percent
ACHIEVEMENT_LEVEL.2016	1	75,552	13.6%
	2	118,168	21.3%
	3	154,582	27.8%
	4	177,332	31.9%
	5	29,827	5.4%
	Total	555,461	100.0%

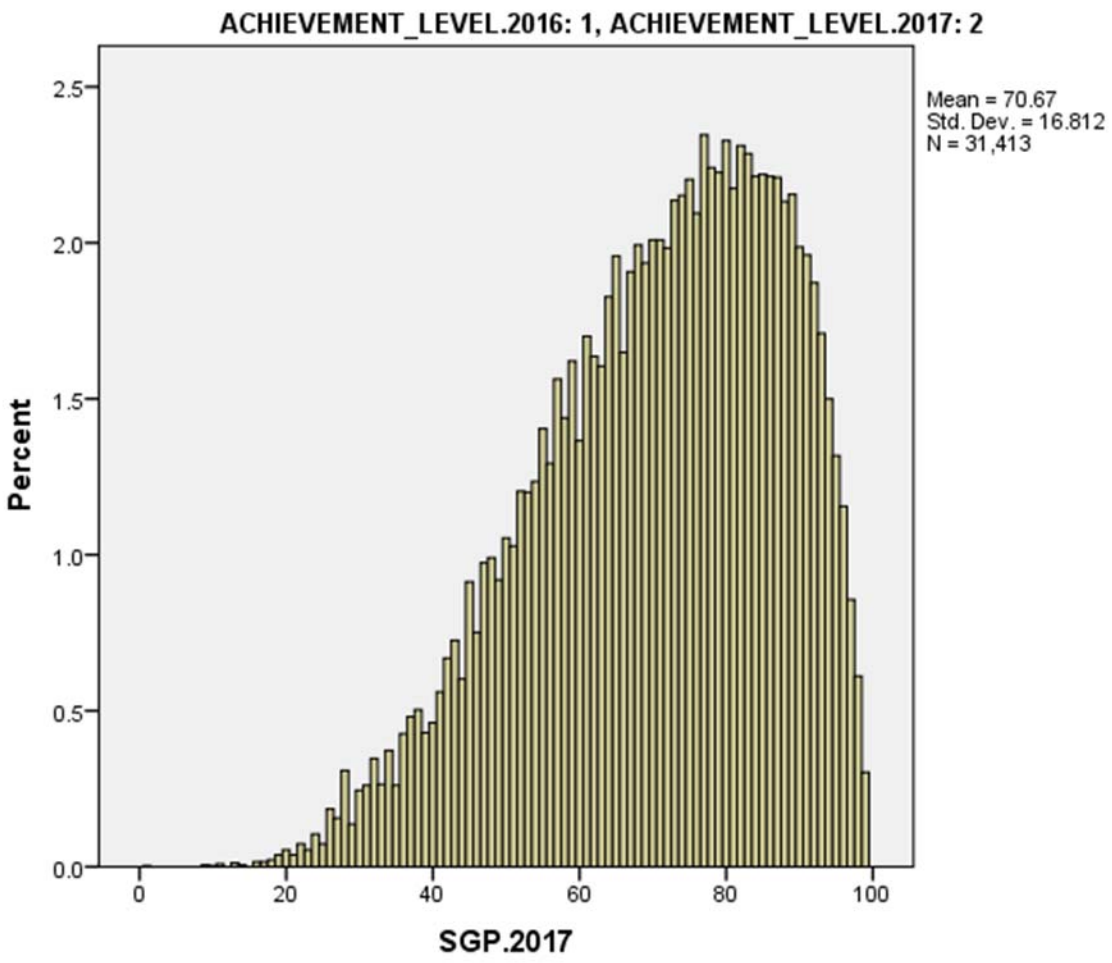
2017 CMAS SGP Distribution fo
at Level 1 in 2016 and Level 1 in



Of the 75,552 eligible students initially scoring at level 1 in 2016, 44,332 (58.7%) again scored at level 1 in 2017.

The MGP for students starting and staying at level 1 was 29.0 (mean= 31.6, SD=20.9) indicating students showed relatively low growth while staying at the bottom of the scale.

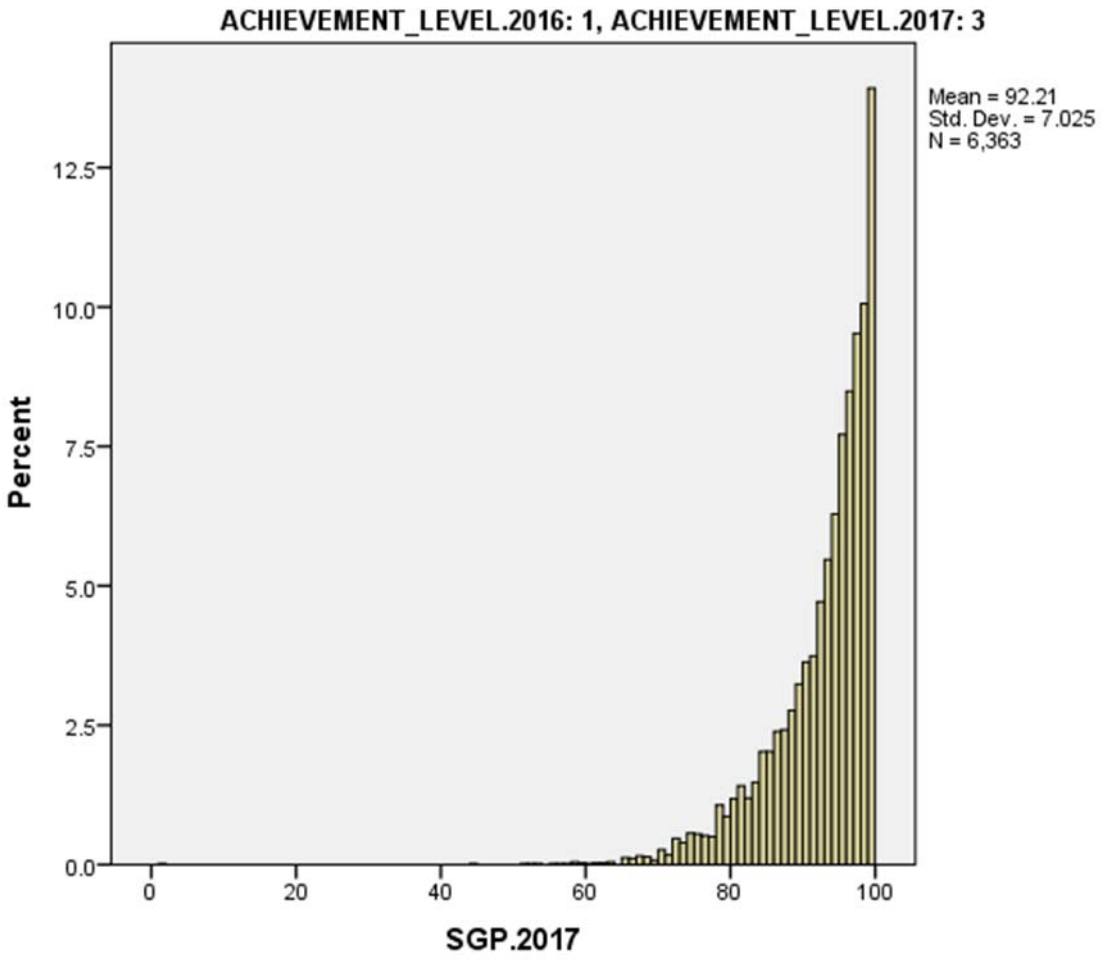
2017 CMAS SGP Distribution fo
at Level 1 in 2016 and Level 2 i



Of the starting level 1 cohort, 25,698 students (34.0%) moved up to level 2 in 2017

The MGP for students moving from level 1 to level 2 was 73.0 (mean= 70.7, SD=16.8), indicating low achieving students had to make significantly above-average growth in order to move up 1 level in a single year.

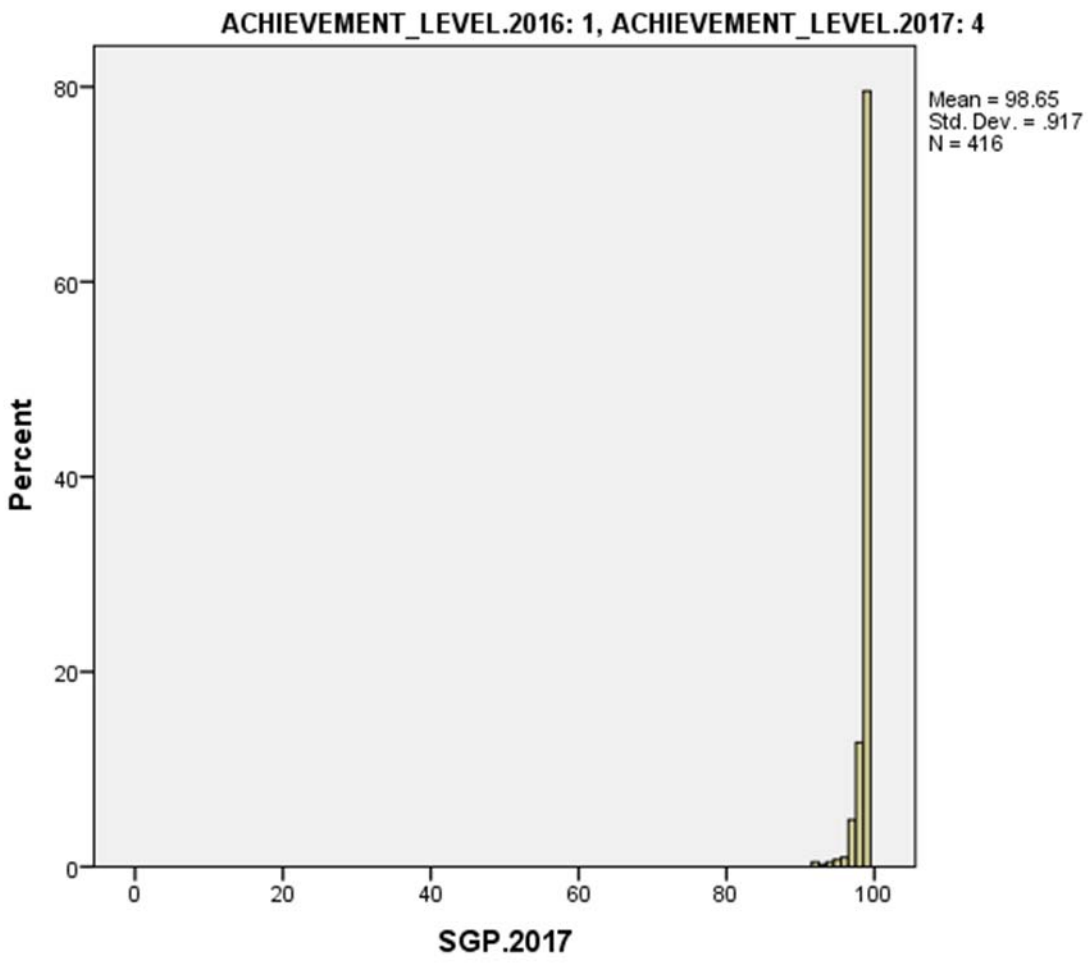
2017 CMAS SGP Distribution fo
at Level 1 in 2016 and Level 3 i



Of the starting level 1 cohort, only 5,163 students (6.8%) moved up to level 3 in 2017

The MGP for students moving from level 1 to level 3 was 94.0 (mean= 92.2, SD=7.0), indicating students had to make extraordinarily high growth in order to move up 2 levels in a single year.

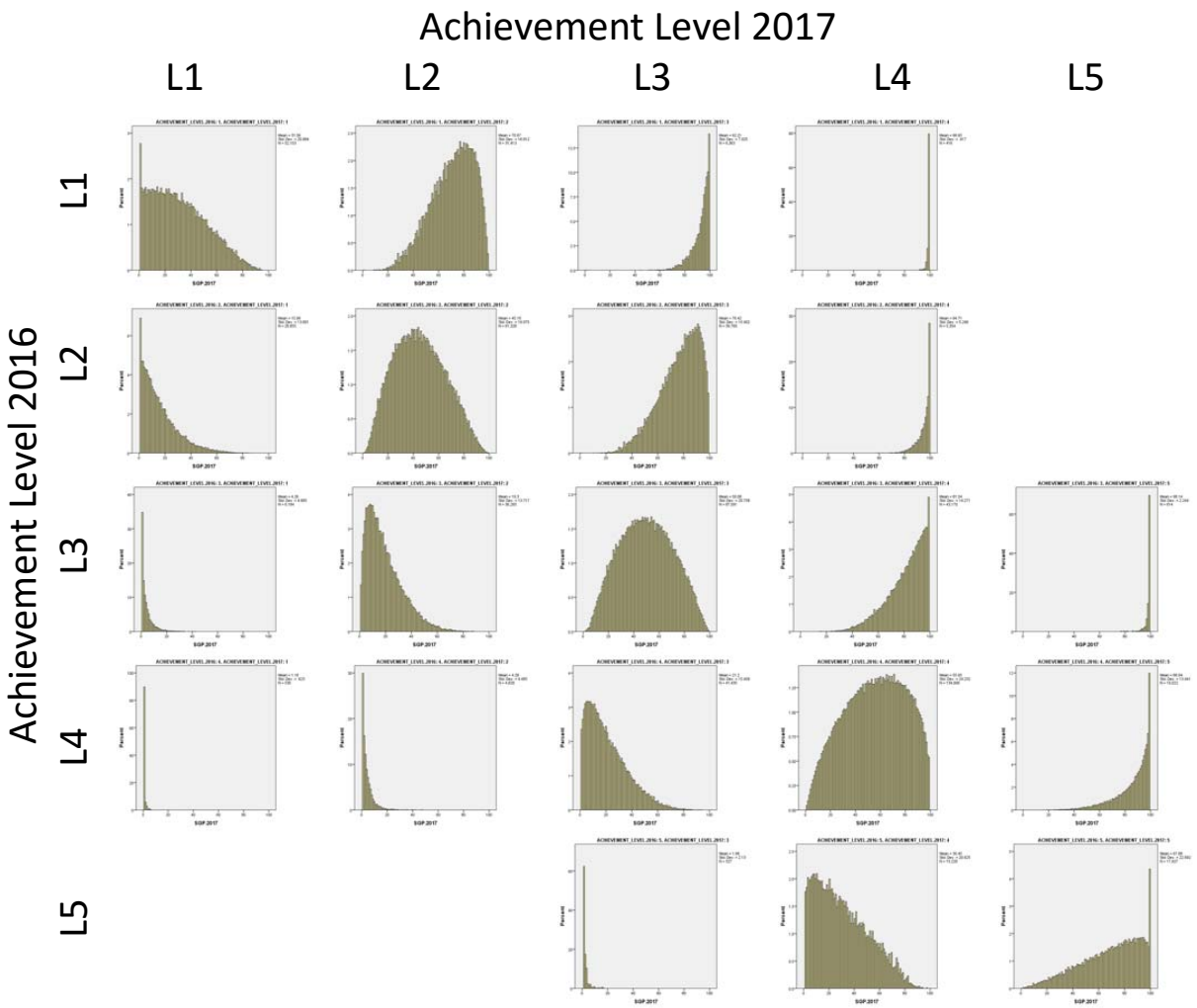
2017 CMAS SGP Distribution fo
at Level 1 in 2016 and Level 4 i



Of the starting level 1 cohort, only 357 students (0.5%) made it to the grade level benchmark (level 4) in 2017

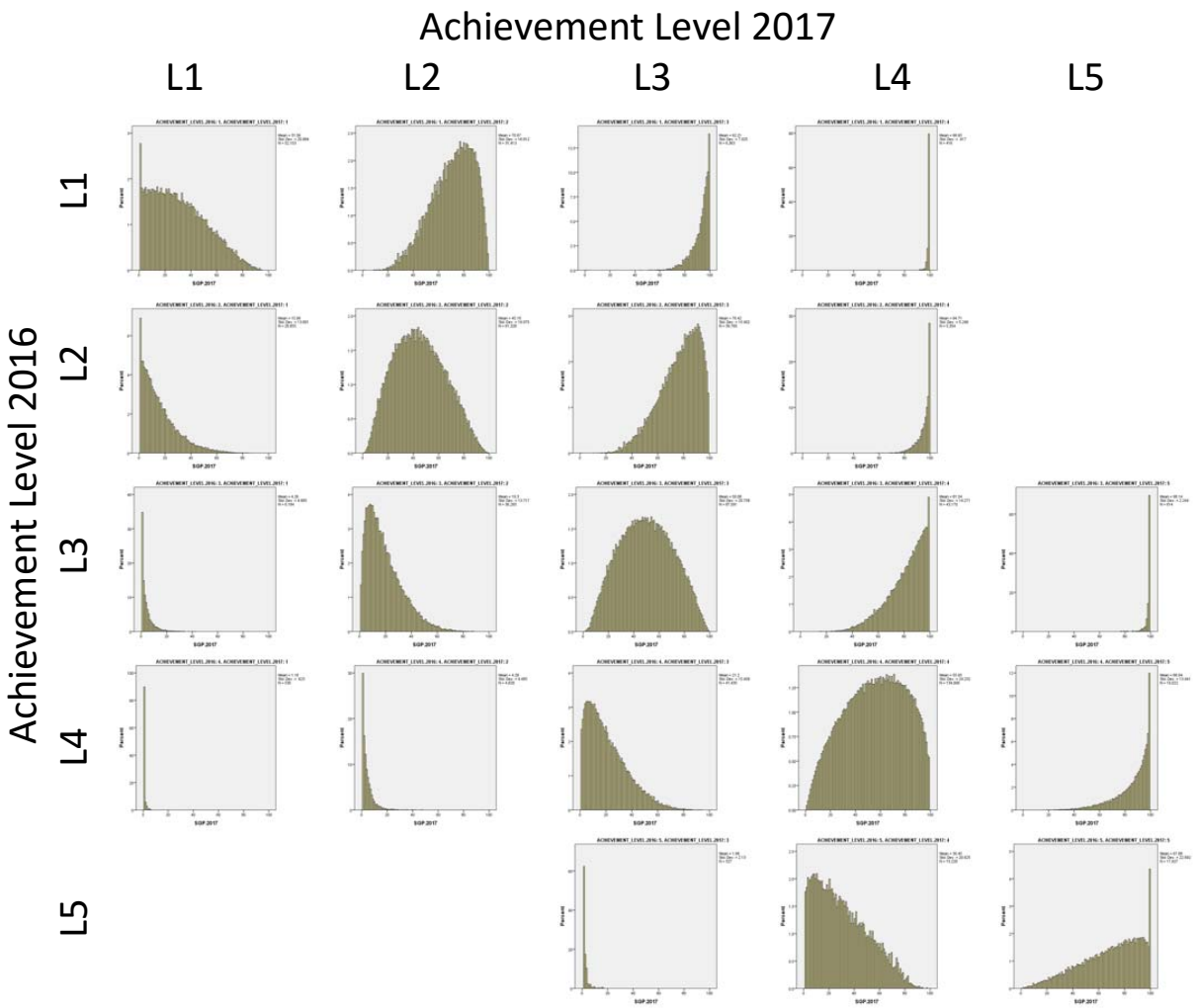
The MGP for students moving from level 1 to level 4 was 99.0 (mean= 98.7, SD=0.9), indicating every single student showed extraordinarily high growth to move up 3 levels in a single year.

2017 SGP Results and Relations
Achievement Trajectories



When you look at all of the starting cohorts by achievement level side, by side, it is clear moving either up or down one or more achievement levels requires significantly higher (or lower) than average growth. Students with typical growth tend to stay at the same achievement level from one year to the next (notable exception for level 5)

2017 SGP Results and Relations
Achievement Trajectories



Are there other patterns to note?

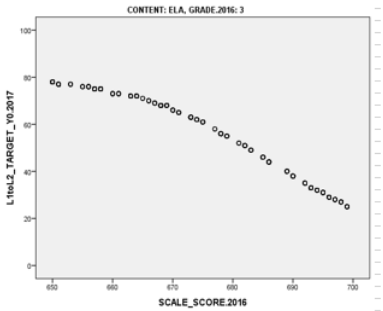
How do these graphs measure up against your experience with student progress over time?

How should this information inform our approach to building a growth-to-standard metric?

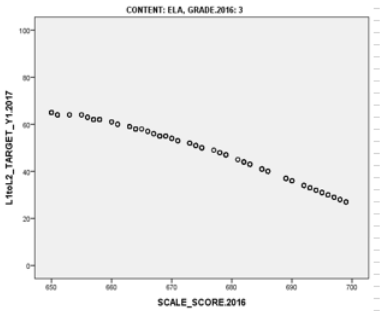
Target Growth Percentiles

2016 Grade 3, Achievement Le
2017 L1/L2 Target Percentiles b

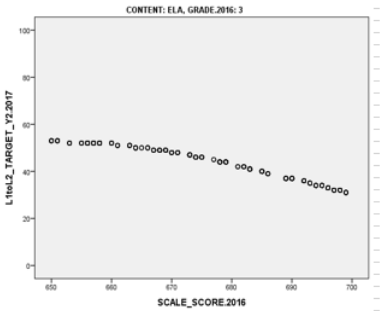
Current Year: g3 to g4



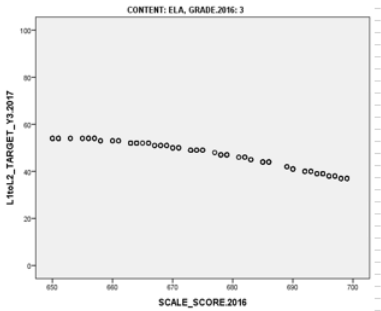
Future Year 1: g3 to g5



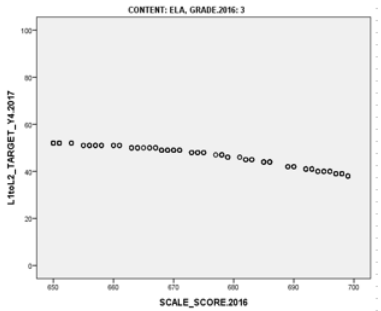
Future Year 2: g3 to g6



Future Year 3: g3 to g7



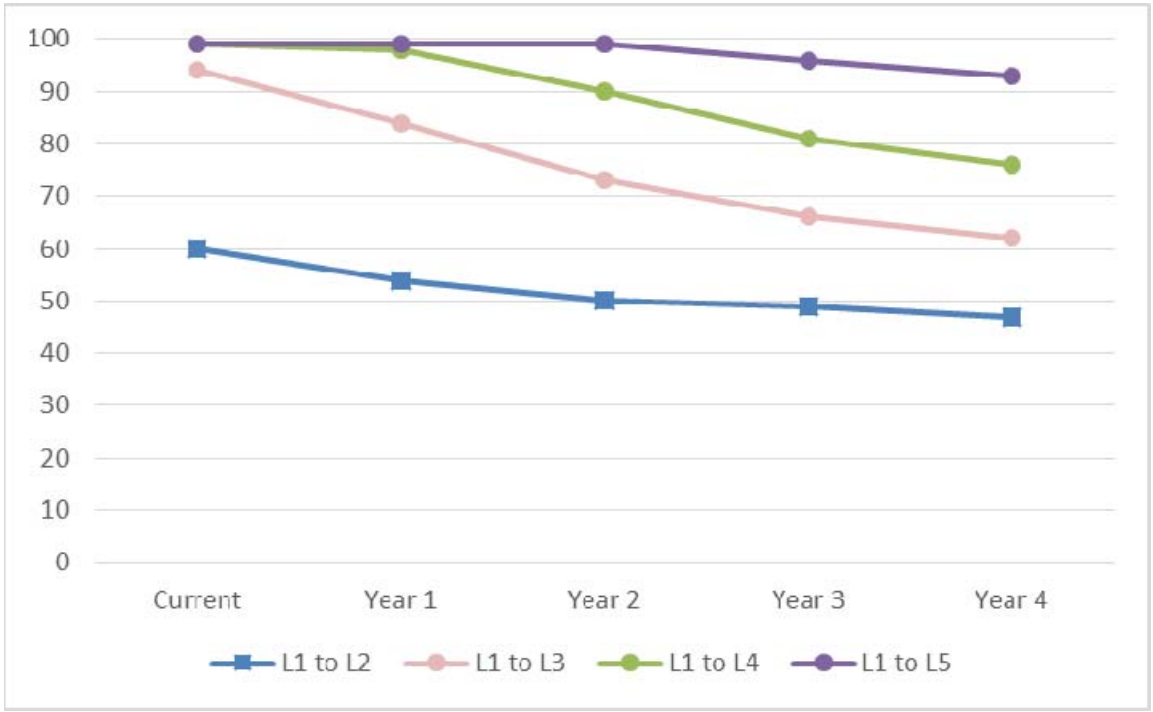
Future Year 4: g3 to g8



This progression of plots shows that, for grade 3 students scoring at level 1 in the prior year (2016), the targets necessary to move to level 2 become more similar as more future years are added, regardless of how close/far a student was initially from the level 2 cut-score.

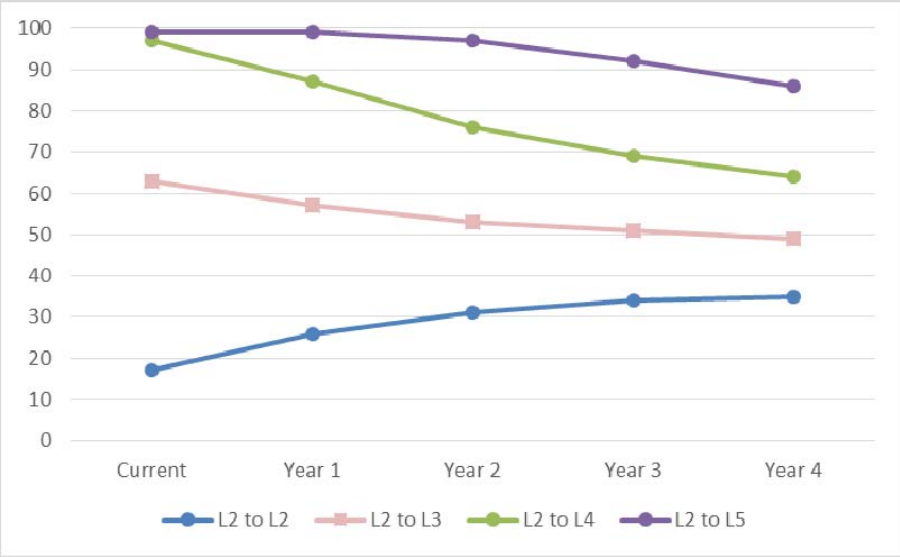
Other grades show similar target flattening over time, so for the sake of analytic ease, the median target percentile will be used to represent the entire cohort of students originally scoring at a given proficiency level across all grades by content area

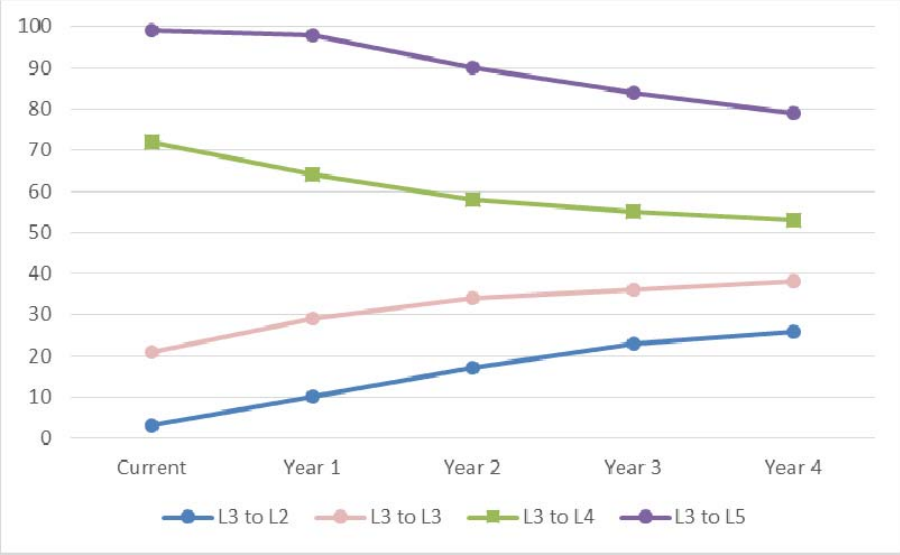
2016 Achievement Level 1 Coh
Percentiles by Achievement Le



For students scoring at Level 1 in 2016 (across all grades), these are the median growth target percentiles (based on 2017 SGP calculations) necessary to move up to levels 2, 3, 4, and 5 in the current year (2017), future year 1 (2018), future year 2 (2019), future year 3 (2020) and future year 4 (2021). Note that even moving to level 2 within a two-year timeframe would require above-average growth.

2016 Achievement Levels 2 & 3 Percentiles by Achievement Le

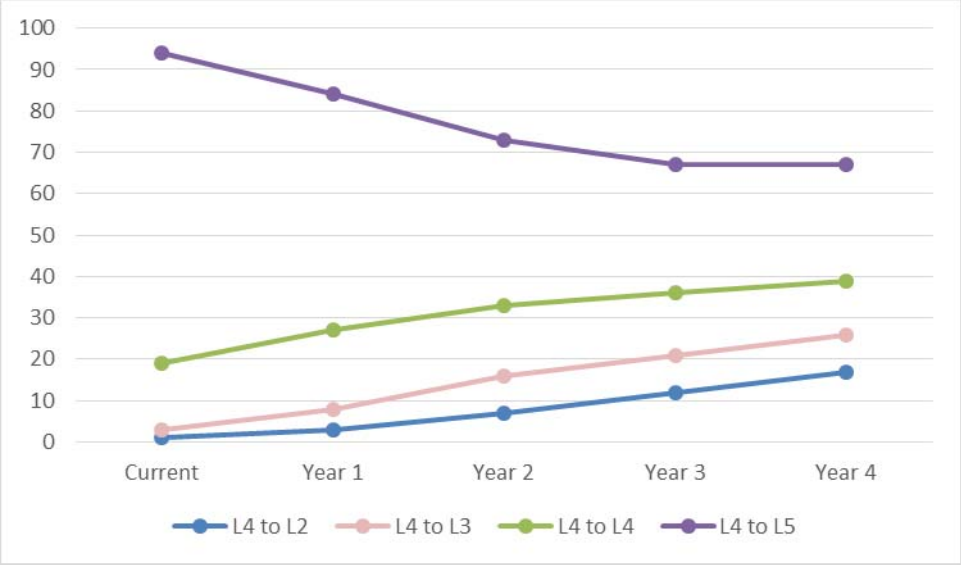


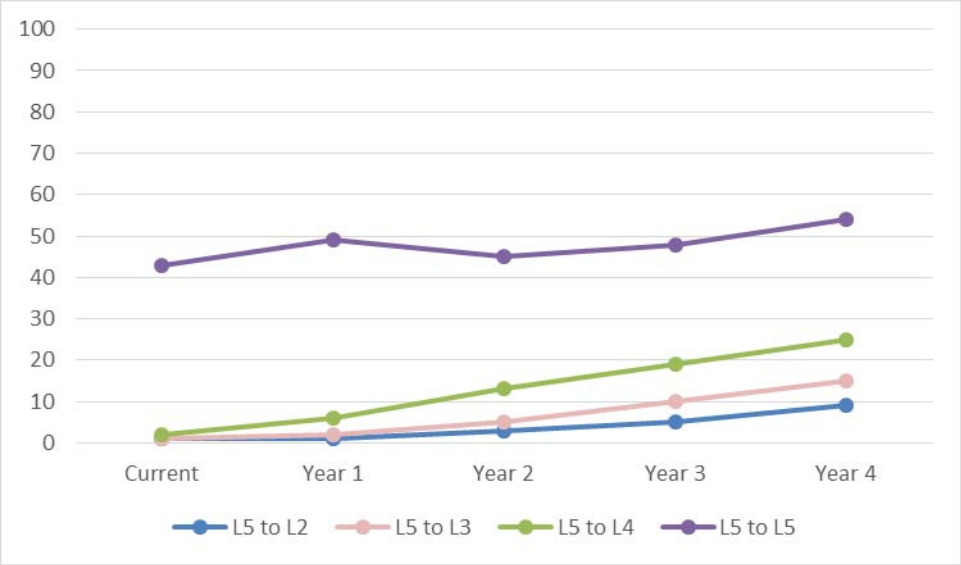


Students starting at level 2 in 2016 would generally need to make slightly above-average growth in order to move up to level 3 within a four-year timespan. Even staying at level 2 would be difficult for a student making "low" (1-34) growth

Similarly, students at level 3 in the prior year would need to make above average growth in order to reach level 4.

2016 Achievement Levels 4 & 5 Percentiles by Achievement Le





Students at level 3 in 2016 making typical growth would be likely to stay at level 4 for subsequent years, but would need "high" (65-99) growth in order to move up to level 5 at any point.

Students at level 5 in the prior year making typical growth would be likely to score at least level 4 in future years, but would need growth right around 50 in order to maintain level 5.

Similar patterns are seen in Math, and middle school targets tend to be slightly harder than elementary school

Target Percentiles by Achiever Timeframe

Given the ease/difficulty of moving up one or more levels, does a one-level-at-a-time stepping stone trajectory seem like the right approach for ensuring ambitious but attainable student-level targets? (we'll get to timeframes in a minute)

Hypothetical Catch Up Determinations

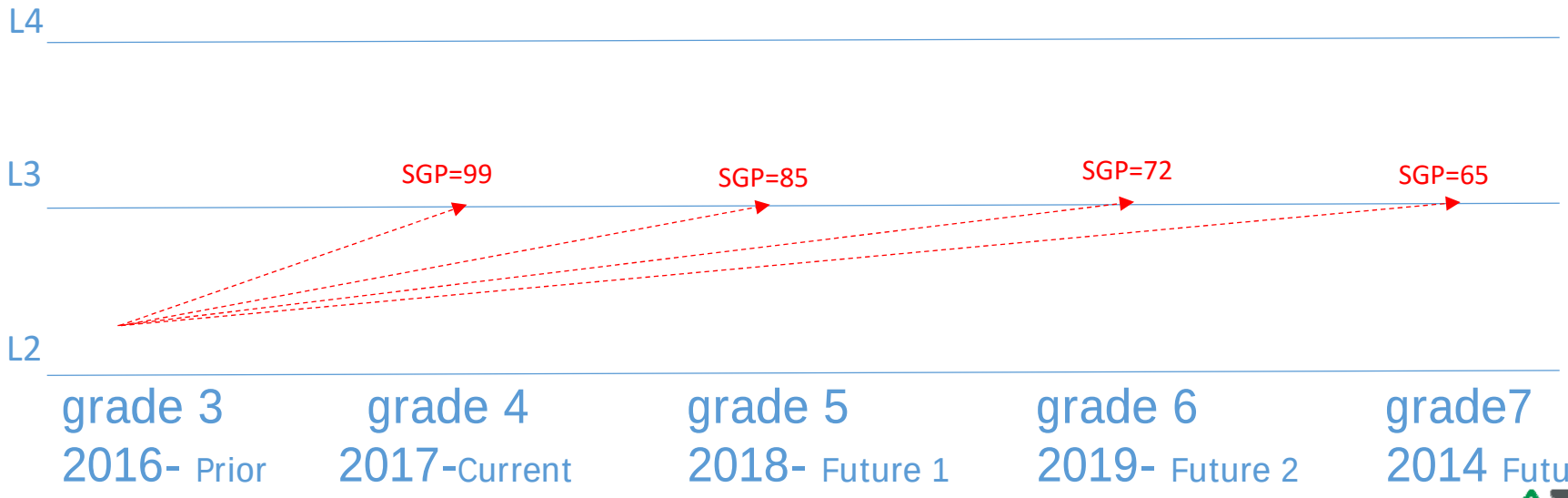
Catch Up 1 Level Determinatio

Assuming you said yes to that last slide, for a stepping-stone trajectory aimed at moving from the previous year's proficiency level up to the next proficiency level, what proportion of students are considered "on-track" to attain this goal?

Note that for the current year target, reality takes precedence over what was predicted by the SGP model as in a small number of cases the two outcomes are not identical.

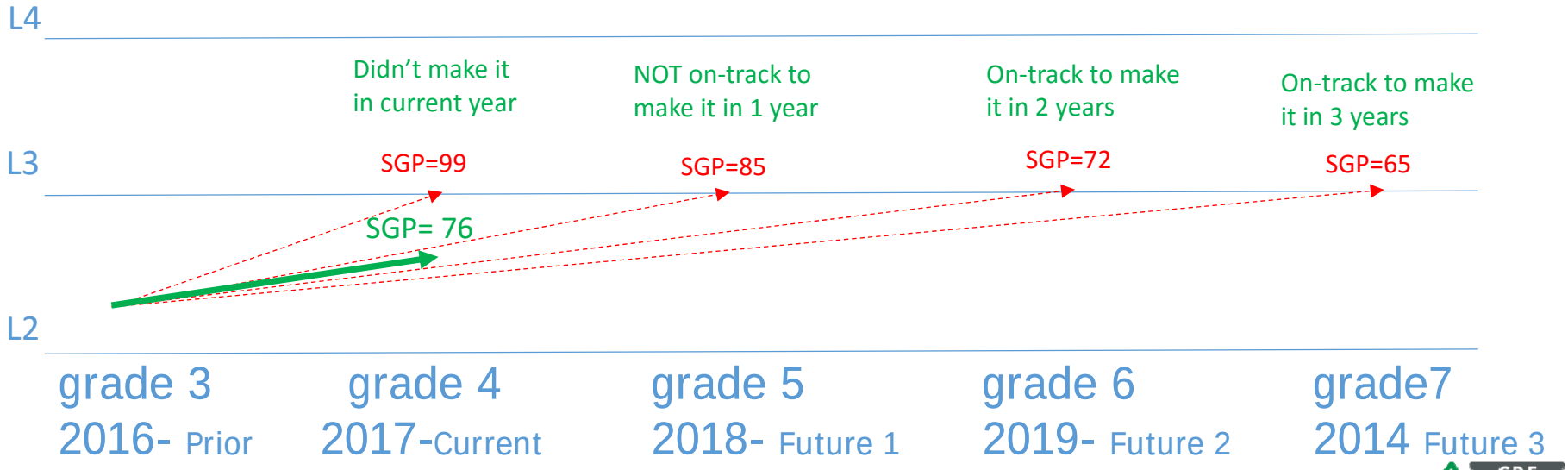
Catch Up 1 Level Determinatio

- Similar to the Catch Up Up methodology used for CSAP/TCAP, except looks for increasing only 1 achievement level with TBD timeframes instead of expecting all students to achieve proficiency within 3-years of by 10th grade
- Pretending the current year is 2017 and we have just established SGPs and target growth percentiles, take an example student currently in grade 4, who scored at level 2 in the prior year 2016 as a 3rd grader.



Catch Up 1 Level Determinatio

- Similar to Catch Up/Keep Up methodology used for CSAP/TCAP, except looks for increasing only 1 achievement level with TBD timeframes instead of expecting all students to achieve proficiency within 3-years of by 10th grade
- Pretending the current year is 2017 and we have just established SGPs and target growth percentiles, take an example student currently in grade 4, who scored at level 2 in the prior year 2016 as a 3rd grader.



2017 Catch Up Determination
Grades 3-8 by 2016 & 2017 Ach

ACH_ LVL. 2016	ACH_ LVL. 2017	CatchUp_y0.2017				CatchUp_y1.2017				CatchUp_y2.2017				CatchUp_y3.2017				CatchUp_y4.2017			
		Not On Track		On Track		Not On Track		On Track		Not On Track		On Track		Not On Track		On Track		Not On Track		On Track	
		Count	Pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct
L1toL2	1	20743	55.8%			14719	49.3%	1469	4.9%	10419	44.2%	1631	6.9%	7586	42.9%	1496	8.5%	4451	40.8%	893	8.2%
	2			12559	33.8%			10466	35.0%			8810	37.4%			6402	36.2%			4040	37.0%
	3			3546	9.5%			2975	10.0%			2496	10.6%			2011	11.4%			1398	12.8%
	4			296	0.8%			237	0.8%			204	0.9%			185	1.0%			136	1.2%
	5			2	0.0%			2	0.0%			1	0.0%			1	0.0%			1	0.0%
L2toL3	1	9066	17.5%			7060	16.6%			4679	14.6%			2762	13.1%			1123	9.9%		
	2	21384	41.3%			15393	36.2%	2200	5.2%	10899	33.9%	2509	7.8%	6742	32.0%	1552	7.4%	3622	31.8%	534	4.7%
	3			17710	34.2%			14789	34.8%			11551	36.0%			8007	38.0%			4761	41.8%
	4			3616	7.0%			3068	7.2%			2465	7.7%			1999	9.5%			1343	11.8%
	5			21	0.0%			19	0.0%			12	0.0%			12	0.1%			12	0.1%
L3toL4	1	2150	2.9%			1620	2.6%			1016	2.2%			578	1.9%			200	1.4%		
	2	13353	17.8%			10794	17.4%			7995	17.3%			4712	15.5%	4	0.0%	1840	12.8%		
	3	34829	46.3%			24592	39.6%	4280	6.9%	16417	35.6%	5326	11.6%	10326	34.1%	3488	11.5%	4914	34.3%	1350	9.4%
	4			24249	32.3%			20311	32.7%			15062	32.7%			10994	36.3%			5825	40.7%
	5			568	0.8%			520	0.8%			269	0.6%			220	0.7%			195	1.4%
L4toL5	1	203	0.2%			143	0.2%			96	0.2%			47	0.1%			19	0.1%		
	2	2031	2.1%			1631	2.0%			1285	2.1%			749	1.8%			289	1.4%		
	3	16516	17.3%			13650	17.1%			11147	17.9%			6826	16.7%			3002	14.8%		
	4	63240	66.4%			45906	57.4%	6808	8.5%	30221	48.5%	12287	19.7%	17879	43.7%	10392	25.4%	8645	42.7%	4425	21.9%
	5			13217	13.9%			11837	14.8%			7319	11.7%			4997	12.2%			3853	19.0%

Note: The total number of students included in each of the future year categories (y1, y2, y3) decreases as students reach grade 8 and are no longer included in the target calculations.

2017 Catch Up Determination
Grades 3-8 by 2016 & 2017 Ach

ACH_ LVL. 2016	ACH_ LVL. 2017	CatchUp_y0.2017				CatchUp_y1.2017				CatchUp_y2.2017				CatchUp_y3.2017				CatchUp_y4.2017			
		Not On Track		On Track		Not On Track		On Track		Not On Track		On Track		Not On Track		On Track		Not On Track		On Track	
		Count	Pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct
L1toL2	1	23589	61.4%			17430	53.8%	1577	4.9%	12619	50.8%	2740	11.0%	8236	47.0%	2525	14.4%	4176	47.9%	1508	17.3%
	2			13139	34.2%			11909	36.7%			8322	33.5%			5897	33.6%			2687	30.8%
	3			1617	4.2%			1441	4.4%			1106	4.5%			841	4.8%			328	3.8%
	4			61	0.2%			49	0.2%			45	0.2%			31	0.2%			15	0.2%
L2toL3	1	15718	23.7%			10080	19.0%			8061	20.2%			4878	18.3%			2501	20.2%		
	2	32274	48.6%			24378	45.9%	3001	5.6%	16146	40.5%	4205	10.6%	10394	39.0%	3332	12.5%	4533	36.7%	2029	16.4%
	3			17155	25.8%			14706	27.7%			10564	26.5%			7361	27.6%			3022	24.4%
	4			1223	1.8%			990	1.9%			877	2.2%			663	2.5%			278	2.2%
	5			1	0.0%			1	0.0%			1	0.0%			1	0.0%			1	0.0%
L3toL4	1	2784	3.5%			1629	2.6%			1369	2.9%			738	2.3%			473	3.0%		
	2	18192	22.9%			14673	23.2%			11457	24.1%	2	0.0%	7232	23.0%	1	0.0%	4125	26.5%		
	3	43252	54.5%			30314	47.9%	5320	8.4%	19744	41.5%	5883	12.4%	12452	39.6%	4641	14.8%	5128	32.9%	3159	20.3%
	4			15182	19.1%			11363	17.9%			9058	19.1%			6381	20.3%			2702	17.3%
	5			23	0.0%			22	0.0%			22	0.0%			13	0.0%			2	0.0%
L4toL5	1	120	0.1%			82	0.1%			71	0.1%			39	0.1%			33	0.2%		
	2	1747	2.1%			1499	2.2%			1322	2.4%			845	2.2%			562	2.9%		
	3	18966	23.1%			16787	24.6%			13346	24.3%			9009	23.8%			5306	27.3%		
	4	56628	69.0%			41650	61.0%	4184	6.1%	30117	54.9%	6462	11.8%	19233	50.8%	6350	16.8%	8620	44.4%	4325	22.3%
	5			4664	5.7%			4060	5.9%			3515	6.4%			2394	6.3%			583	3.0%

Note: The total number of students included in each of the future year categories (y1, y2, y3) decreases as students reach grade 8 and are no longer included in the target calculations.

Questions & Considerations wi
2017 Hypothetical On Track Re

- How should we consider these results in setting expected timelines for students to move up one or more achievement levels?
- What are your reactions to the proportions of students being flagged as On Track and Not On Track? By starting point? By grade and content?
- What additional analyses would be helpful?

Comparison of 2017 Future Year 1 Targets to 2018 Observed Outcomes

Comparison of 2017 Future Yea
Observed Outcomes

We can compare the observed 2018 achievement levels against our assigned Catch Up determinations to see how accurately we are predicting student outcomes for 1 year into the future.

In general, the majority (80-100%) of students we flagged as being On Track to move up 1 proficiency level in future year 1 accomplished this feat.

Students flagged as Not On Track had slightly more variable outcomes, with 60-90% being accurately classified.

Comparison of 2017 Future Yea
Observed Outcomes

EMH. 2016	CONTENT	ACH LVL. 2016 & Target	CatchUp_y1.2017					
			Not On Track			On Track		
			Count	Pct of Ach Lvl Cohort	Pct Correctly Predicted	Count	Pct of Ach Lvl Cohort	Pct Correctly Predicted
E	ELA	L1toL2	11,404	47.0%	64.9%	12,870	53.0%	94.9%
E	ELA	L2toL3	17,509	51.9%	69.8%	16,251	48.1%	93.6%
E	ELA	L3toL4	29,403	60.0%	76.4%	19,619	40.0%	88.9%
E	ELA	L4toL5	51,486	77.9%	90.5%	14,621	22.1%	72.9%
E	MATH	L1toL2	14,251	55.1%	65.1%	11,592	44.9%	92.0%
E	MATH	L2toL3	27,038	64.3%	80.8%	15,022	35.7%	87.4%
E	MATH	L3toL4	37,570	74.4%	89.3%	12,929	25.6%	80.5%
E	MATH	L4toL5	50,752	88.0%	96.3%	6,931	12.0%	60.9%
M	ELA	L1toL2	3,315	59.3%	72.5%	2,279	40.7%	91.8%
M	ELA	L2toL3	4,944	56.4%	74.8%	3,825	43.6%	92.3%
M	ELA	L3toL4	7,603	58.1%	78.4%	5,492	41.9%	89.9%
M	ELA	L4toL5	9,844	71.0%	89.7%	4,024	29.0%	94.2%
M	MATH	L1toL2	3,179	48.4%	81.2%	3,384	51.6%	100.0%
M	MATH	L2toL3	7,420	66.9%	82.7%	3,676	33.1%	97.3%
M	MATH	L3toL4	9,046	70.6%	80.0%	3,776	29.4%	71.9%
M	MATH	L4toL5	9,266	87.6%	96.2%	1,313	12.4%	47.9%

CDE Next Steps

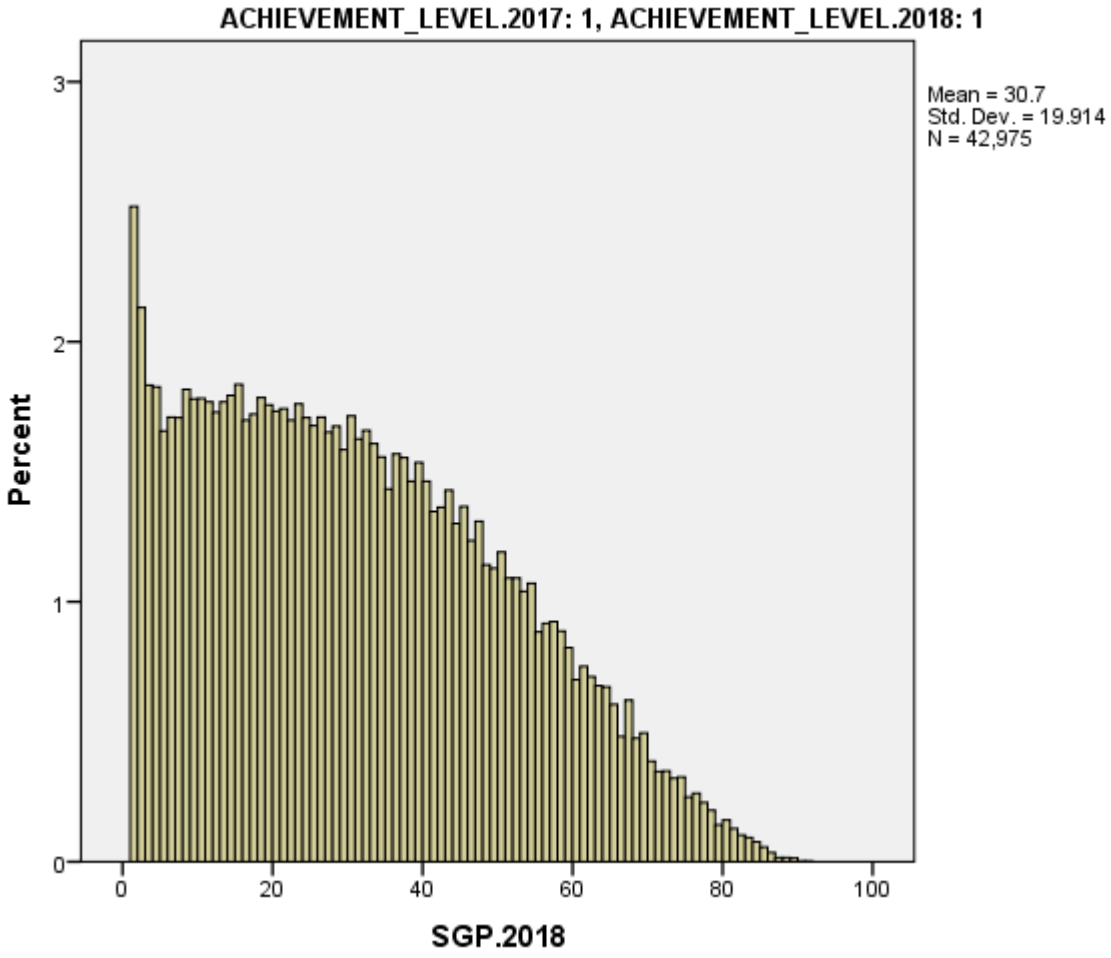
- Revisit Observed 2013-2017 Proficiency Trajectories from May TAP meeting and look at demographic profiles of exemplar schools
- Calculate hypothetical 2017 Keep Up Targets and repeat previous predicted/observed analyses
- Aggregate Catch Up and Keep Up results at the school and district level to see how systems with varying demographic profiles perform
- Other suggestions for analysis?

2018 SGP Results and Relationshi Achievement Trajectories

- Eligible for inclusion in the following analyses were 575,931 students in grades 3-8 with typical grade progressions and CMAS scores for both 2017 and 2018
- The table below shows the proportion of students scoring at each of the 5 CMAS achievement levels in 2017

		Count	Percent
ACHIEVEMENT_ LEVEL.2017	1	75,400	13.2%
	2	116,944	20.5%
	3	158,331	27.8%
	4	184,592	32.4%
	5	35,017	6.1%
	Total	570,284	100.0%

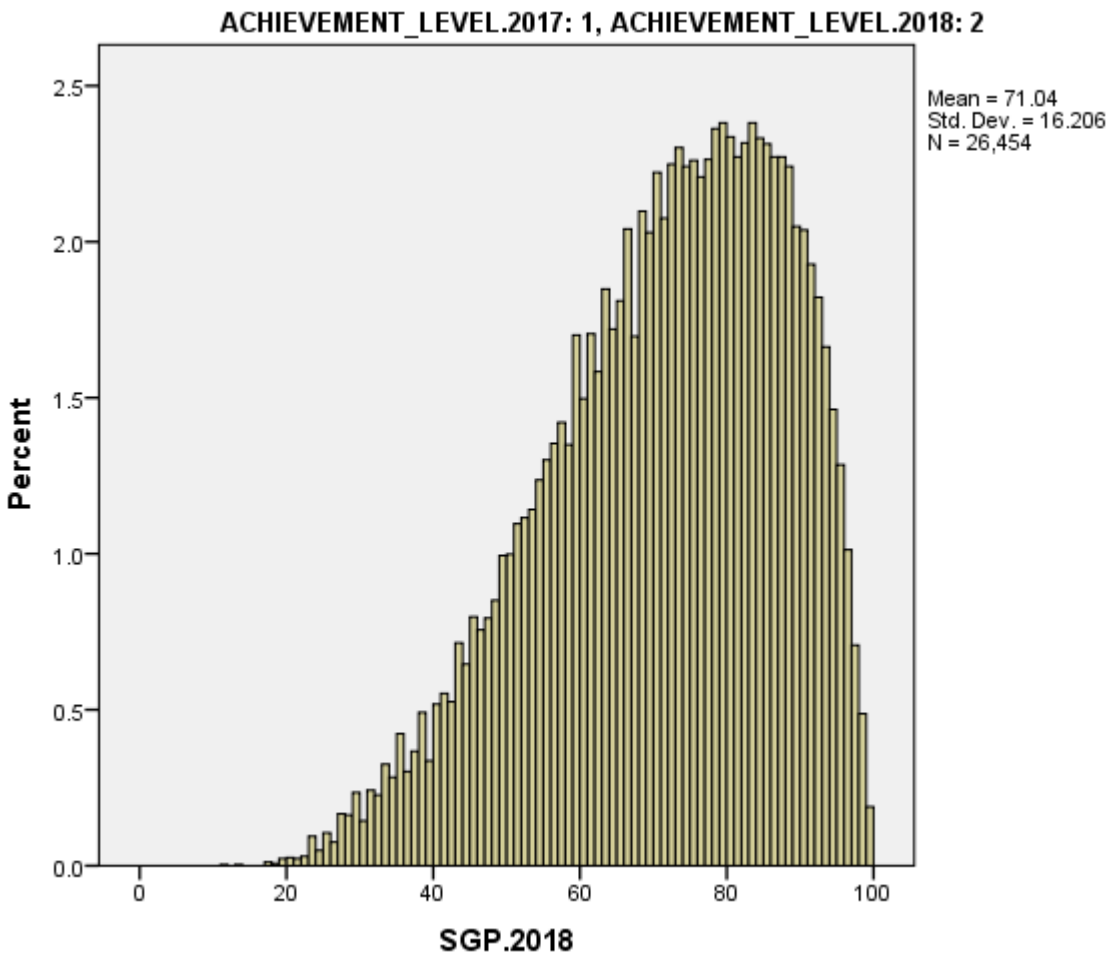
2018 CMAS SGP Distribution fo
at Level 1 in 2017 and Level 1 in



Of the 75,400 eligible students initially scoring at level 1 in 2017, 42,975 (57.0%) again scored at level 1 in 2018.

The MGP for students starting and staying at level 1 was 29.0 (mean= 30.7, SD=19.9) indicating students showed relatively low growth while staying at the bottom of the scale.

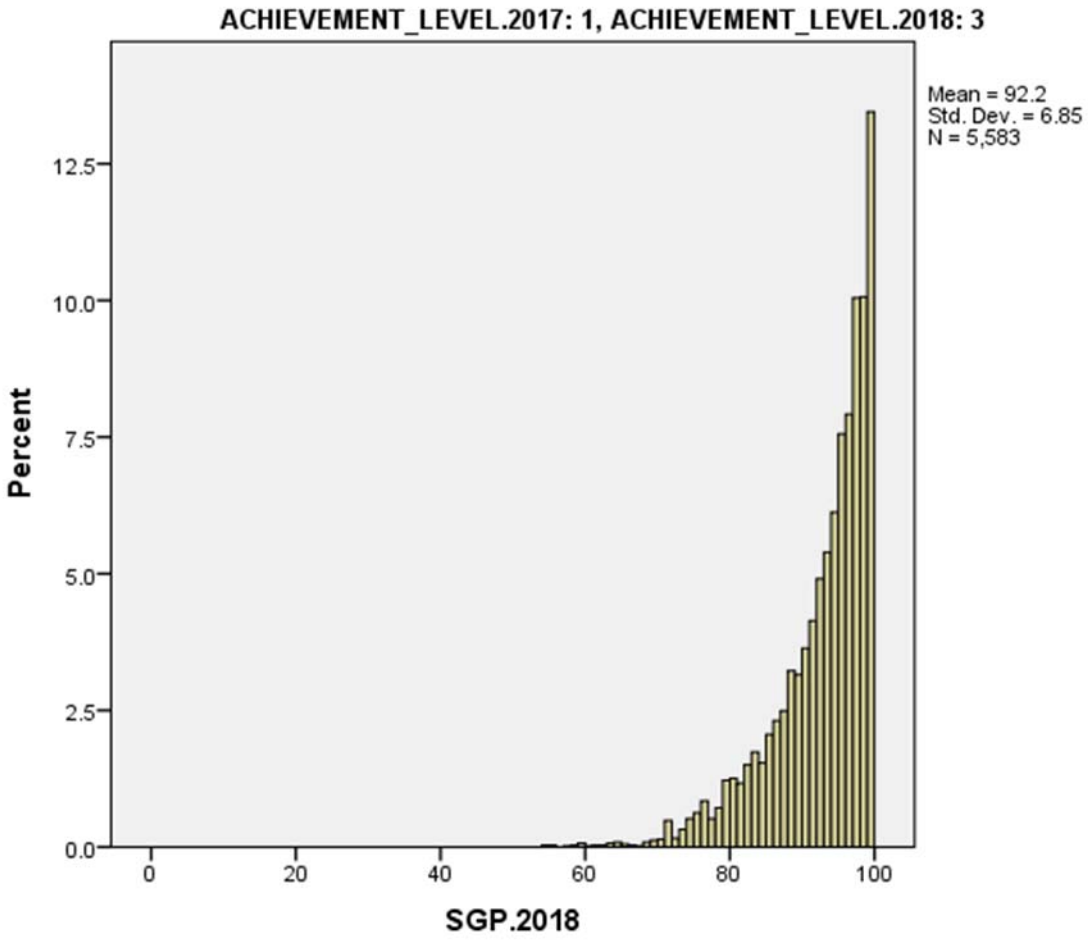
2018 CMAS SGP Distribution fo
at Level 1 in 2017 and Level 2 in



Of the starting level 1 cohort, 26,454 students (35.1%) moved up to level 2 in 2018

The MGP for students moving from level 1 to level 2 was 73.0 (mean= 71.0, SD=16.2), indicating low achieving students had to make significantly above-average growth in order to move up 1 level in a single year.

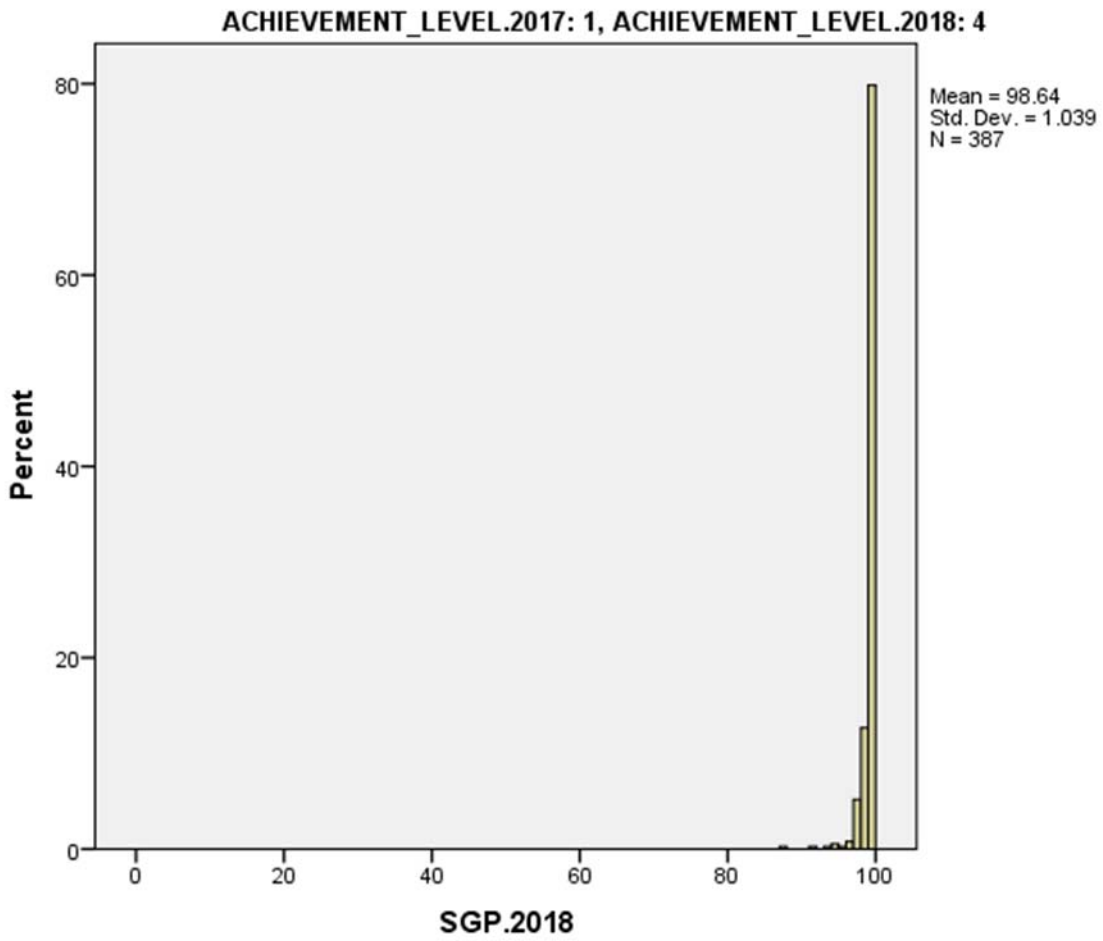
2018 CMAS SGP Distribution fo
at Level 1 in 2017 and Level 3 in



Of the starting level 1 cohort, only 5,583 students (7.4%) moved up to level 3 in 2018

The MGP for students moving from level 1 to level 3 was 94.0 (mean= 92.2, SD=6.9), indicating students had to make extraordinarily high growth in order to move up 2 levels in a single year.

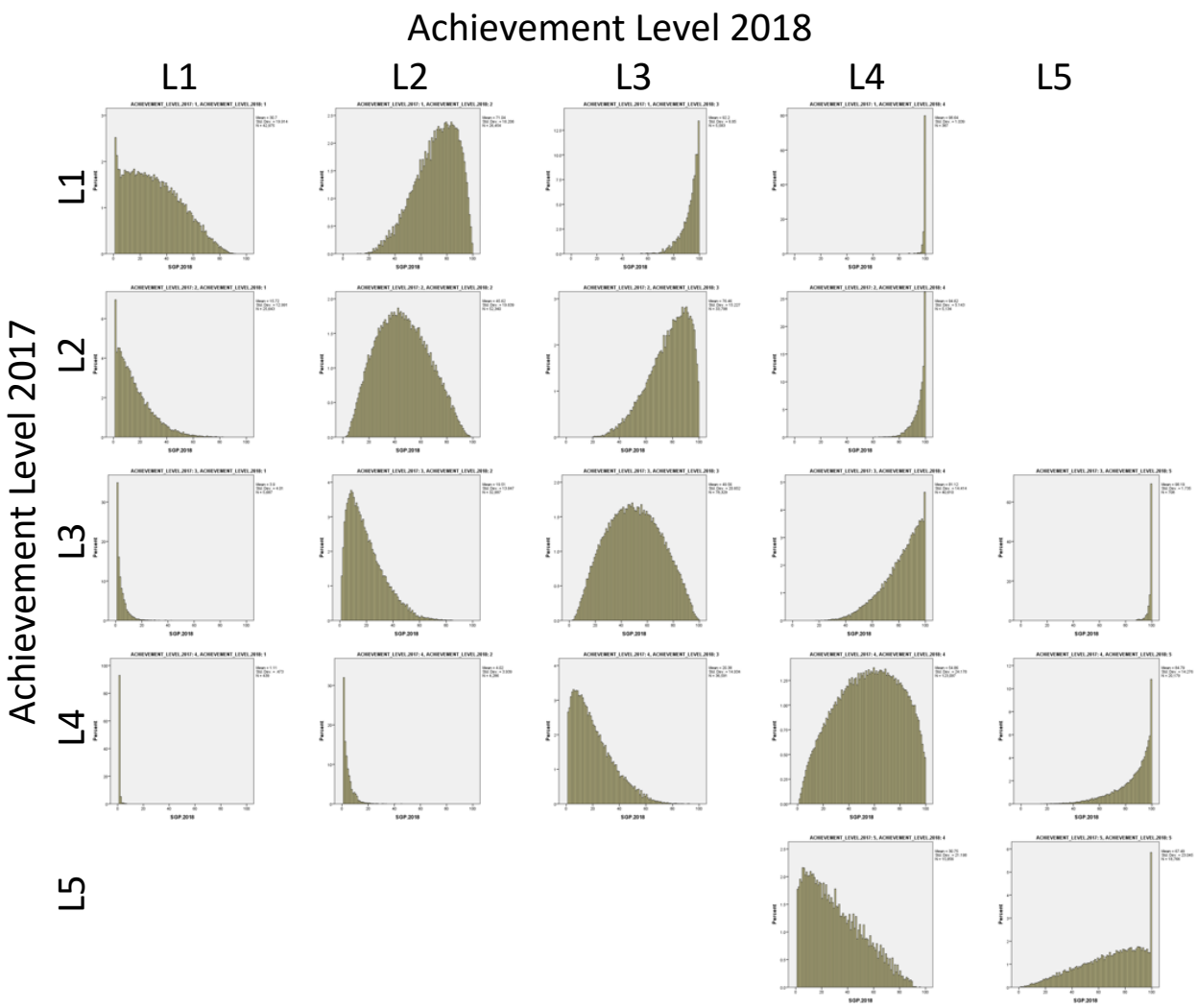
2018 CMAS SGP Distribution fo
at Level 1 in 2017 and Level 4 i



Of the starting level 1 cohort, only 387 students (0.5%) made it to the grade level benchmark (level 4) in 2018

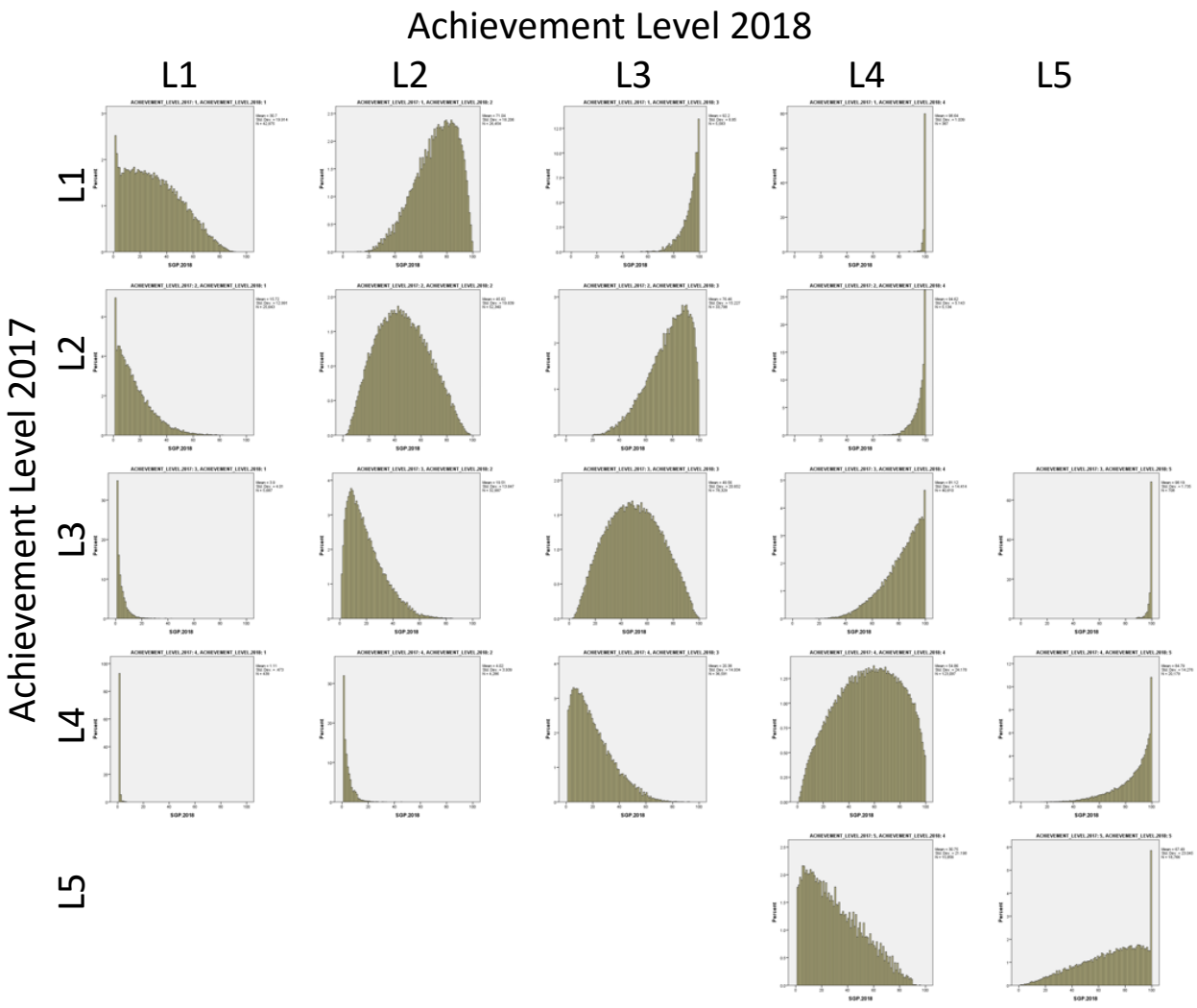
The MGP for students moving from level 1 to level 4 was 99.0 (mean= 98.6, SD=1.0), indicating every single student showed extraordinarily high growth to move up 3 levels in a single year.

2018 SGP Results and Relations
Achievement Trajectories



When you look at all of the starting cohorts by achievement level side, by side, it is clear moving either up or down one or more achievement levels requires significantly higher (or lower) than average growth. Students with typical growth tend to stay at the same achievement level from one year to the next (notable exception for level 5)

2018 SGP Results and Relations
Achievement Trajectories



Are there other patterns to note?

How do these graphs measure up against your experience with student progress over time?

How should this information inform our approach to building a growth-to-standard metric?

CDE Updates

Ashley Piche

Technical Advisory Panel

- Meeting Summary:
  - Suggested future analysis
  - TAP recommendations from this meeting
- Public Comment
- Close Meeting
  - Next Scheduled Meeting, October 26th (Fri), 9-noon at CDE.