Achieving Proficiency for <u>All</u>:

Maryland's Opportunity

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-Concept Paper –

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Executive Summary

Maryland has one of the highest household incomes in the U.S., yet its achievement levels on the National Assessment of Educational Progress (NAEP) are mediocre, falling behind much less wealthy jurisdictions. Our state needs major, rapid reform to enable its students to achieve higher college and career standards.

This proposal outlines a statewide approach intended to enable virtually all students in Maryland to reach the rigorous "proficient" level on PARCC. The core of the approach is one-to-one and small-group tutoring in a Response to Intervention (RTI) framework. The proposal envisions using proven tutoring models and providing funding to enable all schools to hire sufficient teachers to ensure that all students reach the "proficient" standard, some within just one year and almost all of the rest over a period of years.

The proposal lists specific proven classroom and tutoring models, the impact they have had, and the amount using these models could advance Maryland's students toward proficiency. The proposed project is unprecedented in its estimates of the costs necessary to implement RTI statewide in a systematic attempt to ensure proficiency for all, reduce special education placements, and add to knowledge. However, the key components of the approach, particularly proven classroom and tutoring approaches, already exist today, and are ready to be implemented immediately and on a substantial scale. Maryland schools need other reforms as well, but use of proven tutoring approaches in an RTI framework is uniquely capable of being effectively implemented statewide within a relatively brief phase-in period and to show powerful effects in reducing achievement gaps, reducing need for special education, and increasing statewide academic performance.

Introduction

The Kirwan Commission, to fulfill its charge to review adequacy of state funding and to make other recommendations to ensure excellence in K-12 public schools, has an extraordinary challenge, but also an extraordinary opportunity. The report by Augenblick, Palaich, and Associates (APA) does a good job in describing the goals and laying out key investments, with associated costs. The plan could maintain Maryland's status as a good state for education, commensurate with its wealth and current commitment to educate its students.

However, Maryland needs, as the Commission has indicated, a vision for a rapid and substantial improvement in its outcomes. One of the wealthiest states, Maryland scores far below its peers on NAEP reading and math. The charge to the Kirwan Commission reflects this urgency: "to ensure all students have an opportunity to meet the state's proficiency standards and be prepared for college and/or careers."

Today, the state is very far from this goal. On the 2017 PARCC tests, only about 40% of students reached "proficient" in reading and math. Is "all children proficient" merely an aspirational goal, or could it be attained?

This proposal illustrates how Maryland, mostly using funds already proposed by APA, could in fact enable almost all of its students to achieve proficiency. This assertion is based on the use of programs already in existence and proven to be effective, especially one-to-one and small-group tutoring programs in a Response to Intervention (RTI) context. In addition, the plan assumes an ongoing process of effective implementation, monitoring, evaluation, and incremental continuous improvement over time, so that the ultimate goals can be successfully met. I understand the Commission is considering strong accountability oversight of the process and its outcomes, and this should be part of the process as well.

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TABLE 1 AND FIGURE 1 HERE

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The Job to be Done

At each tested grade level (3-8), proficiency on the state's PARCC reading and math tests is defined as a score of 750. Available tests in grades K-2 can be scaled to correspond to this standard. Table 1 shows how much students scoring below that level (60% of students in the state) would have to gain in order to meet the criterion. The amounts assume approximate statewide mean scores of 740 and a standard deviation of 50. They also assume that students have Tier 1 (classroom) instruction that uses proven approaches that can add to the impact of tutoring (see below). Figure 1 shows the same information according to the percent of students at each point on a normal curve.

To understand Table 1, consider students scoring 740. They only have to gain 10 points to achieve proficiency. In effect size terms, this is 20% of a standard deviation, or effect size = +0.20. Most educational programs that have been researched to date cannot routinely produce effect sizes of +0.20, but there are some that can do so for entire classes and schools. These are described on the Evidence for ESSA website (see www.evidenceforessa.org), from our Center for Research and Reform in Education at Johns Hopkins University.

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TABLE 2 HERE

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Now consider students scoring 730, who must gain 20 points on PARCC, an effect size of +0.40. Only one type of educational intervention frequently produces outcomes that large in

rigorous evaluations: one-to-one and one-to-small-group tutoring (up to one-to-six). Table 2 lists tutoring programs in reading and math that have been evaluated in high-quality evaluations. One-to-one tutoring is almost twice as effective as small group tutoring in reading, but both are far more effective than providing no tutoring. Many tutoring approaches do reach an effect size of +0.40.

Now consider students scoring around 720, who need 30 points to reach proficiency, or an effect size of +0.60. Some tutoring programs reach this level, but few if any non-tutoring programs do.

The students scoring 710 (needing 40 points) and 700 (needing 50 points) need levels of success that have never been attained before on a statewide level, effect sizes of +0.80 and +1.00, respectively. How do we reach this group, about 13% of Maryland children?

The answer for these students, and many others, would appear to be *multiple years of tutoring.* Much of the rhetoric about tutoring has assumed that students struggling in reading just need one great year of one-to-one tutoring and they will achieve proficiency and maintain it. Yet research does not support this. In order to achieve and sustain substantial gains, beyond ES=+0.60, students may need multiple years of tutoring. No one has studied the provision of tutoring to the students who need it most over many years during their elementary and middle school careers, but it seems logical that this would be a powerful means of helping the lowest achievers attain, or at least closely approach, proficiency on PARCC or similar assessments, especially if combined with other interventions (see below). For example, one study of one-to-one tutoring by teachers over 2 ½ years found particularly large impacts (effect size = +0.68).

The students with the greatest difficulties, those scoring below 700, represent about 19% of all Maryland students. These students can also achieve proficiency, but it will require multiple years of one-to-one tutoring targeted to their needs.

Response to Intervention (RTI)

Response to Intervention (RTI) is a widely known organizing scheme for providing educational services for struggling students. RTI suggests three "tiers" of service. Tier 1 is improving classroom instruction, Tier 2 providing less intensive remedial services, and Tier 3 providing very intensive services.

This concept paper advocates a very specific application of RTI. First, it emphasizes use of *proven programs* in all tiers. These are programs that have been compared to control groups in rigorous experiments and found to be significantly more effective than ordinary practices.

Second, in Tiers 2 and 3, this RTI model specifies use of proven tutoring approaches. As noted earlier, no other approach has such powerful impacts. Tier 2 is assumed to mean small-group tutoring, averaging one to four, but no more than one to six, and Tier 3 is assumed to mean one-to-one tutoring. Other services may be necessary for struggling students, such as services to solve social-emotional or behavioral problems, reduce truancy, ensure that students have eyeglasses if they need them, and so on, but the core RTI service stream proposed here is use of proven programs in classrooms and schools (Tier 1), small group tutoring for students who need it (Tier 2), and one-to-one tutoring for students for whom small group tutoring is not sufficient (Tier 3). Figure 2 depicts this organization of services.

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FIGURE 2 HERE

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RTI is very widely advocated. However, nowhere is RTI implemented at anywhere near significant scale with sufficient tutoring or a sufficient focus on proven programs to substantially improve achievement or reduce special education rates.

Interventions Beyond Tutoring

This concept paper emphasizes tutoring because it is the most effective intervention we have in hand today, and because it has the clearest cost implications for the Kirwan Commission's charge. However, there are many much lower-cost interventions available that have strong evidence of effectiveness for all students, not just struggling learners. These should be used as classroom Tier 1 approaches, in the RTI framework.

Proven programs of all kinds, meeting the evidence standards of the federal Every Student Succeeds Act (ESSA), can be found at www.evidenceforessa.org. There are more than 100 proven programs in reading and math for grades PK-12. Among these are whole-school reform models for elementary schools, such as Success for All and Positive Action, and for secondary schools, such as Talent Development High Schools and Building Assets, Reducing Risk (BARR). Professional development for teachers in cooperative learning and metacognitive skills are another example. Some technology programs meet evidence standards. All of these programs are widely used, ready for replication, and known to be effective, with effect sizes usually in the range of +0.20 to +0.30 (to add to effects of tutoring). These can significantly increase total impacts for students who receive tutoring, and extend benefits to whole schools, not just struggling students.

RTI models in math and in social-emotional learning may also be used, to improve outcomes in these areas and reduce need for Tier 2 and Tier 3 interventions and special education placements.

In grades 9-12, tutoring is not currently anticipated as a component of this plan. There are no proven tutoring models at the high school level. Some tutoring of high school students might be of benefit, but development and research are needed to establish what kinds of approaches might be effective at this level. Based on currently existing research, high school reform models designed to improve graduation rates, prepare students for college and careers (such as Career and Technical Education), and deal with behavior and social-emotional problems, may be selected by schools. These could include whole-school high school reform models such as Talent Development High Schools, BARR, ISA, and other approaches.

Practicalities

The Kirwan Commission is charged with recommending adequate funding, not designing instructional strategies for the whole state. However, it is worth considering how a reform approach based on tutoring within an RTI context might work in practice, and how the details affect the costs.

Proven Classroom Programs (Tier 1)

In selecting programs to serve as Tier 1 (preventive) interventions, schools should be given resources based on the number of students scoring below "proficient" on PARCC. However, these programs may be used for all students in a given school or grade level. For example, a school might select beginning reading programs or middle school math programs or

schoolwide behavior management approaches proven to be effective, with a goal of increasing overall achievement and reducing the need for Tier 2 and Tier 3 tutoring and special education. Funding for such programs will generally be expected to be used for proven programs selected by school staffs and district leaders, which would enable schools to engage with providers who supply materials, software, and professional development.

Proven Tutoring Models (Tier 2 and Tier 3)

This concept paper assumes that schools will select tutoring programs that have been shown to work in rigorous evaluations. These would include the programs listed in Table 2, plus additional programs to be successfully evaluated in the future. Districts or possibly MSDE could contract with providers to supply materials, software, training, and follow-up coaching to the tutors. Use of proven models, and adhering to the strategies they used in their successful evaluations, is an essential element of the plan outlined in this paper, as there is little evidence that simply hiring tutors and having them make up their own strategies will have the impact needed to accomplish the state's goals for underperforming students.

Tutoring Schedules and Group Sizes

Tutoring would be scheduled throughout the day during times other than core reading and math instruction. One-to-one tutoring would be scheduled in half-hour blocks, and one-to-small group in 45-minute blocks. Small-group sessions may involve two to six students at a time. I have estimated a mean group size of four.

Tables 3A and 3B suggest amounts of tutoring to be provided to students over their time from kindergarten to eighth grade. The table shows the number of "tutor-years" for students at

given distances from proficiency*. A teacher of small-group sessions would be expected to see about seven groups, and therefore 28 students in groups of four, over a five-hour tutoring day (leaving time for planning, supervision, and breaks). A one-to-one tutor would see 10 students in 30-minute sessions, on the same basis.

A "tutor-year" is equivalent to service given to one struggling reader every day for a year, either individually or in a small group. Schools might decide, based on a student's needs, to provide varying amounts of tutoring at different times. For example, a student who qualifies for two "tutor years" might receive four half-years in each of grades 1, 2, 4, and 6. Although reading should be the primary focus of tutoring, because it is the key to virtually all school learning, schools may also decide to allocate tutoring services to math, if this is the greatest area of need for certain students.

Table 3A shows estimated needs for tutoring in grades K-5, and 3B shows needs in grades 6-8.

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TABLES 3A and 3B HERE

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Table 3A estimates that 113 students in an elementary school of 450 would receive Tier 2 group tutoring each day in sessions of 45 minutes. Tier 2 groups would average 4 students. This would require a total of 4 tutors, seeing 28 students (7 sessions x 4 students per session) each day. In addition, approximately 73 students would receive Tier 3, one-to-one tutoring each day, in 30-minute sessions. If tutors teach 10 sessions per day, this requires 7.3 tutors, for a total of

* The data are actually "bands" around a given mean. For example, 730 represents students scoring 725-735.

11.3 tutors for a school of 450. A lead tutor would also be designated to help all tutors in the school.

For a model middle school (Table 3B), we estimate, using similar logic, that 150 students in a middle school of 450 students would receive Tier 2 tutoring each day in groups of 4, requiring 5.4 tutors. In addition, another 60 students would receive one-to-one tutoring for 30 minutes daily (or 3 times a week in 45-minute periods). This would require 6 tutors, for a school total of 11.4 tutors, plus a lead tutor, for a total of 12.4.

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Table 4 Here

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Costs

The costs of the tutoring and other proven programs and services are estimated in Table 4. These costs would apply when the proposed model is fully implemented, and would of course be phased in over time.

The numbers of teacher tutors in Table 4 are drawn directly from Tables 3A and 3B. These estimates were based on average schools of 450 students, with 60% not achieving "proficient" on PARCC. To expand these to the whole state, I assumed 400,000 students in grades K-5 and 200,000 in grades 6-8, as shown in Table 4. I then multiplied the average compensation ($84,000) by the anticipated need for tutors.

I also included $200 for each student not meeting the "proficient" standard for use in adopting proven programs for grades PK-8. These are intended to serve as Tier 1 prevention programs. $200 x 360,000 students=$72,000,000.

Adding together these figures, I get an estimate of $1,453,464,000 when the plan is in full operation. Subtracting funding already in the APA plan for tutoring ($519 mil) and savings from reduced need for special education ($379 mil), the net cost would be $555,464,000. (See below and Table 5). Considering current state education costs of $13,890 x 880,000 students = $12,334,320,000, the proposed cost would be 4.5% more than current expenditures.

Resources and Savings to Support Tutoring

The APA plan, summarized on pp. 11-13 of Appendix F, already contains some tutoring resources. Also, intensive tutoring over multiple years is expected to reduce the need for special education services for high-incidence disabilities. These offsets are summarized in Table 5.

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TABLE 5 HERE

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Tutoring Resources in the APA Plan

The APA plan anticipates one tutor for every school of 450 students, plus one for every 125 at-risk students (I use the term low-performing, meaning scoring less than 750 on PARCC or similar assessments). These tutoring positions add up to 6180 teacher-tutors statewide, at an annual cost of $519 million.

Savings Due to Reduced Needs for Special Education

Special education is budgeted in the APA report, using their “evidence-based” (EB) formula, at one teacher and one aide for every 150 students, for a total of 5920 teachers and 5920

aides statewide, at a cost of $758 million. If special education placements are reduced, all costs of special education, including these, would be reduced.

Approximately 12% of Maryland students are now in special education. Most of these are in "high incidence" categories, especially learning disabilities, speech/language, and attention deficit disorders. With multi-year one-to-one tutoring, it is likely that these categories could be greatly reduced, perhaps by as much as 65% of all placements in special education. Because students in high-incidence categories are usually taught in regular classes all or part of the day, they cost less than students in low-incidence categories, so the economic impact is difficult to estimate. However, if the provision of multi-year one-to-one tutoring and other Tier 1, 2, and 3 services is able to reduce special education assignments by 65%, the impact on the APA estimates might be to cut costs in half, from $758 million to $379 million per year.

Phase-In

The investments and interventions outlined in this plan should be phased in over a period of time. This would soften the impact on state and local finances, enable MSDE, districts, and states to learn how to use the new resources effectively, and facilitate studies of the use and impacts of tutoring and other elements. This process would align with the Commission's preliminary discussion of strict management accountability to ensure effective use of new funding on faithful implementation of proven programs, to study ways to maximize impacts and ensure cost-effectiveness, and to evaluate overall impacts of the new policies as they roll out across the state.

Figure 1

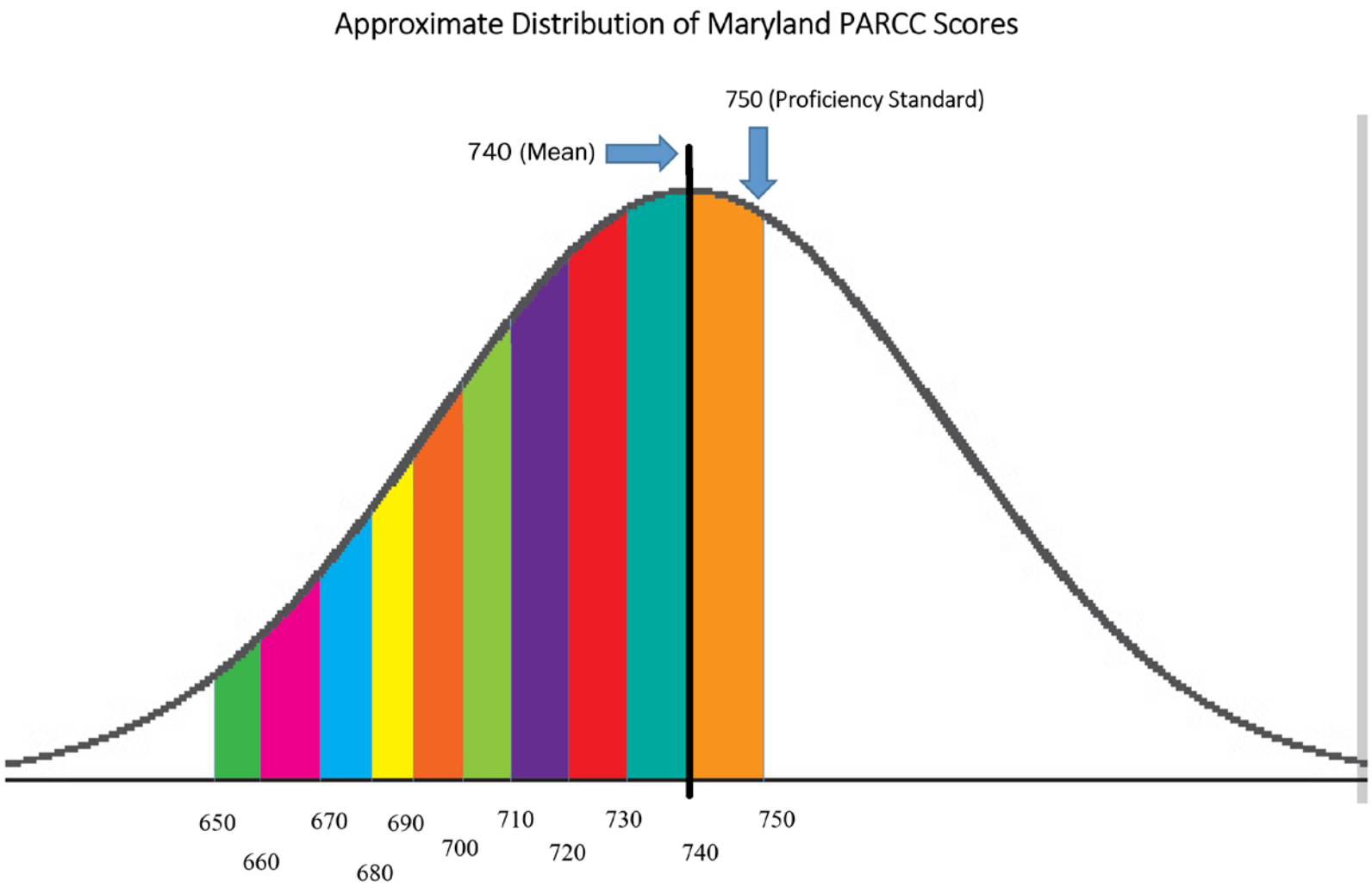
Approximate Distribution of Maryland PARCC Scores
750 (Proficiency Standard)
740 (Mean)
650
660
670
680
690
700
710
720
730
740
750

Figure 2

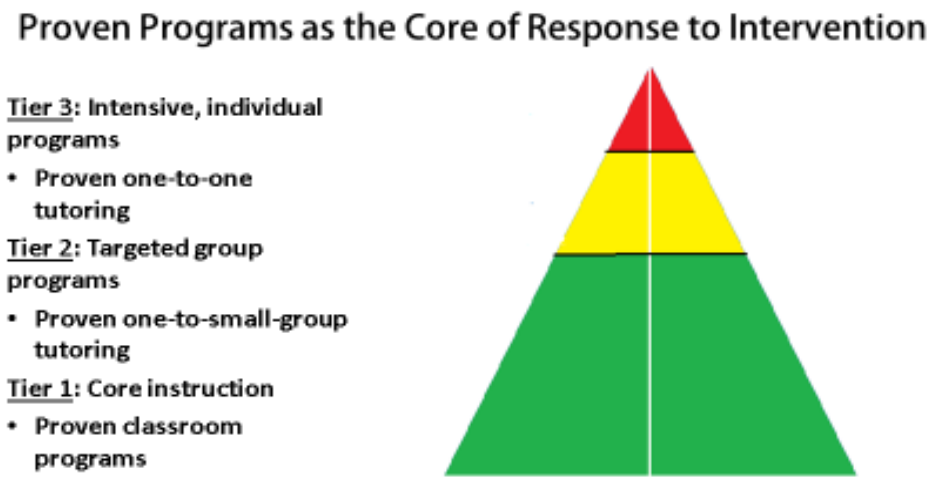
Proven Programs as the Core of Response to Intervention
Tier 3: Intensive, individual programs
• Proven one-to-one tutoring
Tier 2: Targeted group programs
• Proven one-to-small-group tutoring
Tier 1: Core instruction
• Proven classroom programs

Table 1 **The Job to be Done: Proficiency for All**		
Proficiency goal in reading and math on PARCC: 750		
Average PARCC Score	Distance to go (in effect sizes)	Proportion of All MD Students (Approx.)
747	+0.06	4.0
740	+0.20	7.9
730	+0.40	7.9
720	+0.60	7.6
710	+0.80	7.0
700	+1.00	6.2
690	+1.20	5.3
680	+1.40	4.4
670	+1.60	3.4
660	+1.80	2.6
650	+2.00	1.9
<650		1.8
TOTAL		60.0

Table 2
Tutoring Programs in Reading and Math Meeting ESSA Evidence Standards

Reading Programs

One-to-One	**Grades**	**Studies**	**Average ES**	**Study-Weighted Means**
Reading Recovery	1	4	+0.43	
Lindamood	K-2	2	+0.68	
Targeted Reading	K-1	2	+0.21	
Alphie's Alley	1	1	+0.53	
Reading Rescue (Teacher)	1	1	+1.08	
Perry Beeches	7	1	+0.36	
Sound Partners	K-1	4	+0.58	
Reading Rescue (Para)	1	1	+0.89	
SMART	1-2	1	+0.48	
REACH	7-8	1	+0.42	+0.54
One-to-Small Group				
Butterfly Phonics (1-6)	7	1	+0.30	
QuickReads (1-2)	2-5	2	+0.21	
Lightning Squad (1-6)	1-3	1	+0.20	
Tutoring with Alphie (1-6)	1-3	2	+0.43	+0.30
Math Programs				
	Grades	**Studies**	**Average ES**	
One-to-One				
Math Recovery	1	1	+0.30	
Galaxy Math	1	1	+0.24	
Catch-Up Numeracy	2-6	1	+0.21	+0.25
One-to-Small Group				
Number Rockets (1-3)	1	1	+0.34	
Fraction Face-Off (1-3)	4	2	+0.51	
Pirate Math (1-3)	3	1	+0.37	
ROOTS (1-5)	K	1	+0.32	
focusMATH (1-3)	3-5	1	+0.24	
SAGA (1-2)	9-10	1	+0.23	+0.36

Table 3A **Tutoring Need and Numbers of Students in an Elementary School of 450** **With 60% Below Proficient (n=270)**					
Actual or Predicted PARCC	N	Tier 2 Tutor/Years per Student	Tier 2 Tutor Years	Tier 3 Tutor Years Per Student	Tier 3 Tutor Years
747	18	0	0	0	0
740	36	1	36	0	0
730	36	2	72	0	0
720	34	3	102	1	34
710	32	4	128	2	64
700	28	3	84	3	84
690	24	3	72	3	72
680	20	3	60	3	60
670	15	3	45	3	45
660	12	3	36	3	36
650	9	3	27	3	2
<650	6	3	18	3	18
Total	270				
Daily tutoring need per year			680 tutor years		440 tutor years
Divided by 6 years			÷ 6=113 students tutored daily, groups of 4		÷ 6=73 students tutored daily
Tutors needed			Seven 45-min sessions daily= 28 students served per tutor=4 tutors		Ten 30-min sessions daily per tutor = 7.3 tutors
Total				11.3 tutors + 1 lead tutor 12.3 tutors	

Table 3B **Tutoring Need and Numbers of Students in a Middle School of 450** **With 60% Below Proficient (n=270)**					
Actual PARCC Score	N	Tier 2 Tutor/Years per Student	Tier 2 Tutor Years	Tier 3 Tutor Years Per Student	Tier 3 Tutor Years
747	18	0	0	0	0
740	36	0	0	0	0
730	36	1	36	.5	18
720	34	1	34	.5	17
710	32	2	64	1	32
700	28	2	56	1	28
690	24	3	72	1	24
680	20	3	64	1	20
670	15	3	45	1	15
660	12	3	36	1	12
650	9	3	27	1	9
<650	6	3	18	1	6
Total	270				
Daily tutoring need per year			448 tutor years		781 tutor years
Divided by 3 years			÷ 3=150 students tutored daily		÷ 3=60 students tutored daily
Tutors needed			Groups of 4, seven 45-min sessions daily= 28 students per tutor=5.4 tutors		Ten 30-min sessions per week per tutor = 6 tutors
Total				11.4 tutors + 1 lead tutor 12.4 tutors	

Table 4 **Estimated Annual Costs of Proposed Plan to Increase Student Success Statewide**			
Category	Unit Costs (Salary + Benefits)	Number	Total Cost
Teachers	$84,000		
Elementary (400,000 students)		12.3 per 450 students =10,934	$918,456,000
Middle (200,000 students)		12.4 per 450 students =5512	$463,008,000
Proven programs for Tier 1 ($200 x 60% students below "proficient")			$72,000,000
TOTAL (Before offsets)			$1,453,464,000
Offsets (From Table 5)			
Tutoring in APA Plan			($519,000,000)
Special education savings			($379,000,000)
Total offsets			($898,000,000)
Net Cost of Plan			**$555,464,000**

Table 5 **Resources and Savings to Support Tutoring**		
Resources in Offsets: APA Plan	Number of Teachers	Cost @ $84,159
Tutors		
1 per 450 students	1956	$164 mil
1 per 125 low-performing students	4224	$355 mil
Total tutoring staff from APA Plan		$519 mil
Special Education		
1 teacher, 1 aide per 150 students-reduce need by half	Teachers 5920/2=2960 Aides 5920/2=2960	$249 mil $130 mil
Savings from special ed		$379 mil
Total resources and savings		**$898 million**