

**Gifted Services Advisory Committee
REPORT AND RECOMMENDATIONS**

Memorandum

Date: February 1, 2013

To: Arlington School Board

From: Gifted Services Advisory Committee

Subject: 2012-2013 Report and Recommendations

As foreshadowed in our report last year, our Committee is resubmitting previous recommendations that were referred for further study (leading to no final decision or action) or otherwise not implemented by APS staff. The following page outlines a collection of themes we call our “Greatest Hits,” and the table included as Appendix 1 displays the history of support and the implementation status of our recommendations from the past decade. With the notable exception of increased staffing levels for Resource Teachers for the Gifted (RTGs), few of our recommendations have been implemented by APS.

The Committee has consistently recommended improvements in the implementation of current policies across the Gifted Services program spectrum, and the Advisory Council on Instruction has supported these proposals—often ranking them among their top recommendations. These recommendations were developed after careful study and extensive discussion of their merits over several years. We believe they retain significant promise to improve delivery of services to our gifted student population at very little or no cost, and they warrant adoption by APS.

All our recommendations are premised on a unified educational philosophy: all students, regardless of ability level, are entitled to an education that challenges each student to achieve his or her full potential. Like special education students, students

By graduation, one in four APS students has been identified as needing gifted services in one or more academic areas or in the fine arts.

The Gifted Services Advisory Committee's "Greatest Hits"

For effective differentiation to occur, gifted students need to be clustered

- APS should change existing policy to require that gifted students be placed in classrooms in clusters of at least five students. (2009 Rec #2)
- At the elementary level, implement cross-grade achievement grouping in all core subjects by at least third grade. (2009 Rec #5)

Gifted students require options for acceleration by subject and by grade

- Provide intensified class options in all core subjects at the middle and high school levels. (2011 Rec #1)
- Encourage subject-specific and whole-grade acceleration. (2009 Rec #5)

APS needs to apply policies consistently across all of its schools

- Require principals to certify that classroom teachers who are assigned gifted students demonstrate effective differentiation techniques specifically targeted for gifted students. (2009 Rec #3)
- Provide an equitable, appropriate education for all students, including gifted students, through consistent application of policies across schools. (2011 Rec #3)

Adequate staffing is critically important to effective implementation of the APS model

- APS should, (a) at a minimum, keep the current full-time RTG positions in the largest elementary schools and, (b) if possible, apply the 500-student planning factor to add full-time RTG positions where school populations warrant the increase. (2011 Rec #3)

Accurately and objectively measure student potential and progress

- Require data-driven determination of appropriate instructional levels. (2010 Rec #2)
- Investigate adoption of "value-added" or "adaptive" testing to measure whether each student is making at least one year of progress in each academic subject each year. (2007 Rec #2)
- Base instructional and placement decisions for students on objective measures of individual student progress in order to close individual achievement gaps. (2011 Rec #2)

Please note that many of these recommendations have been offered in multiple years. Appendix 1 provides a more complete Survey and Analysis of Prior Recommendations.

who are identified for gifted services can better achieve their full potential when provided a curriculum or mode of instruction appropriate to their learning needs. Starting from this principle of equity, the Committee has formulated recommendations which are supported by well-established educational research and information about Arlington Public Schools.

Not coincidentally, it is important to note that all of our recommendations would directly serve all of Arlington's students, not just the unmet needs of our gifted students. Indeed, these recommendations address a national problem, not just Arlington's. An extensive, multi-year review by the National Science Board cautions that the economic strength of our country relies on developing the talent of our brightest students:

Arlington, home to governmental and private sector research powerhouses and top-tier cultural venues, needs to **take a leadership role in changing the educational model** to raise achievement levels across the ability spectrum of students.

“Clearly then, a critical challenge in this ‘conceptual economy’ is to discover and then develop the next generation of innovators who will help create the ‘products and processes’ that will fuel our future economic prosperity.”¹

Now is the time for Arlington to close the individual achievement gap. Every child deserves the opportunity for an education that challenges that child to achieve their full potential. Our community, our commonwealth, and our country grow increasingly eager for the accomplishments of all students, including those identified as gifted.

In order to streamline the report, extensive footnotes have not been included. They can be found in previous reports. Appendix 3 provides several general references which we commend for your review.

¹ *Preparing the Next Generation of STEM Innovators: Identifying and Developing our Nation's Human Capital*, report of the National Science Board (May 5, 2010), at 8, available at <http://www.nsf.gov/nsb/publications/2010/nsb1033.pdf>.

RECOMMENDATION ONE:

In order to reduce bias and increase the effectiveness of gifted identification for all students (including those whose first language is not English), APS will administer a nonverbal ability test (such as the Naglieri Nonverbal Ability Test) to all second grade students.

Virginia has set a goal to reduce the gap in gifted identification rates between minority and white students, and in 2012 mandated changes to the gifted identification process to include a requirement for an objective measurement instrument to reduce any intentional or unintentional bias. In response to this mandate, APS selected, and the APS School Board adopted in 2012, the Naglieri Nonverbal Ability Test (NNAT) as its objective measurement instrument for elementary students.

APS administers the NNAT only after students have been referred for the gifted identification process by either a teacher and/or parent. Students who are being considered for identification for gifted services therefore must first rely on teacher- and/or parent-initiated referral without additional information from a nonverbal measurement instrument. As a result, APS's gifted identification process continues to be at risk for human bias, whether intentional or not, in five significant ways:

(1) Parents without English proficiency and parents from lower socioeconomic backgrounds will continue to be at a disadvantage for initiating referrals compared to parents who are English proficient and/or are from higher socioeconomic backgrounds.

(2) Teachers will continue to struggle to accurately assess children whose primary language is not English and whose English proficiency is not yet developed.

(3) Teachers will continue to be challenged to accurately assess children who also have special education needs, hearing impairments, and other disabilities that put them at a disadvantage with standard verbal (audio and written) based assessments.

(4) Teachers and parents may not identify students who exhibit gifted student behaviors which are often contrary to societal definitions of a successful student.

(5) Teachers and administrators may be unduly influenced by research regarding the effect of lower socioeconomic backgrounds and childhood development, and automatically assume their students from lower socioeconomic backgrounds did not

The Naglieri Nonverbal Ability Test is a brief nonverbal measurement of ability that does not require the child to read, write or speak. The test is a nonverbal measure of general ability comprised of progressive matrix items that utilize shapes and geometric designs interrelated through spatial or logical organization.

receive enough early childhood learning stimulation and therefore may show more limited intellectual development.

The following school systems give the Naglieri Nonverbal Ability Test to all students:

Alexandria City	1st grade
Fairfax County	1st grade
Manassas City	2nd grade
Loudon County	3rd grade

Note that APS’s process does not rely on any one measurement as a sole determining factor, but eliminating bias in the initial referral for gifted identification is a critical step to achieving fair and impartial identification across racial, gender, language, socioeconomic, and special needs backgrounds.

Other school systems in the Northern Virginia area have also selected the NNAT as an appropriate and reasonably unbiased and effective tool to assess the learning ability of their students, and have decided to administer it to all students of a certain grade. All the

students in those schools therefore realize benefits from this test because their teachers have non-biased assessment information upon which to base instructional levels. In this manner, achievement gaps are narrowed for all students—whether they are identified for gifted services or not.

Estimated Cost to Implement Recommendation 1		
Instrument	2000 Naglieri online test + scoring package for every 2nd grade student less 100 students who already receive the test after teacher/parent referral	\$19,000
Personnel	The instrument would be administered by existing APS personnel (similar to the administration of the DRP reading assessment where additional staff costs are not incurred)	\$0
Total		\$19,000

RECOMMENDATION TWO:

APS will place elementary students identified for gifted services in cluster groups of at least five students (where this number of identified students exists in a subject area).

RECOMMENDATION THREE:

APS will provide intensified class options in all core subjects at the middle and high school levels.

The Committee joins these two recommendations because they rest on the same foundation: academic performance of all students improves when class placements include achievement-grouping of students and the curriculum is adjusted to correspond to ability levels.

APS recognizes and supports differentiated instruction as an appropriate means to educate and challenge its population of students identified as gifted or accelerated learners. Common practice and research confirm the idea that this instructional method is best supported and most effective when students receive instruction together with like-ability peers. Grouping clusters of at least five students facilitates the teacher's work, helps give differentiated instruction a chance to succeed within our heterogeneous classrooms, and thus promotes achievement by students of all abilities represented.

Differentiated instruction begins with pre-assessment of students to determine their ability, interests and learning styles. Teachers then design instruction to appropriately challenge students a little beyond their capacity. While continuing to make connections with prior knowledge, students are continuously presented challenge and rigor so they see a relationship between effort, learning, and academic success.

Educational research consistently demonstrates that instruction for students at all achievement levels is more effective in classrooms with achievement grouping and corresponding curricular adjustments.

“Assigning students to classes by ability and then providing them with the same curriculum has limited effect on achievement; but when the curriculum is altered, clustering and ability grouping benefits all students. Clustering promotes achievement among all groups and grade levels of students, and no particular group of students misses out on the gain.”²

² Brulles, D., Saunders, R., & Cohn, S., “Improving Performance for Gifted Students in a Cluster Grouping Model,” *Journal for the Education of the Gifted* (2010), n. 1, at 344-45, citing Farrar, E., “The effect of ability grouping on student attitudes and achievement in science labs,” in McCoy, L.P. (ed.), *Studies in teaching 2003 research digest* (2003), Winston-Salem: Wake Forest University Department of Education, at 51-55; Winebrenner, S. & Devlin, B., “Cluster grouping of gifted students: How to provide full-time services on a part-time basis (ED607)” (2001); Arlington, VA: ERIC Digests; Cohn, S.J., “The optimal match strategy: An academic alternative for gifted students,” in Kanevesky, L. (ed.), *Issues in Gifted Education* (1986), at 44-68.

Teachers are able to effectively differentiate instruction only when the number of ability groupings within one classroom does not exceed three levels. They cannot be

Teachers report that—given the broad spectrum of ability and achievement levels in their classrooms—they have little option but to devote more of their attention to students who are struggling or at the middle of the achievement curve so that their classes get a high percentage of passing scores on the state Standards of Learning exams. The Committee believes that few instructional efforts are made to challenge advanced students to meet their individual potential, because their passing scores can be taken for granted.

expected to differentiate for 20 to 30 students within one classroom in which there are often five different learning levels. Teachers are simply stretched too thin and have insufficient time or attention to tailor instruction to all of the ability levels in such a classroom.

In achievement-grouped classrooms with advanced students, teachers are able to cover required material at a higher level of complexity, accelerate progress, deepen learning of topics, and add enriched extension activities. In achievement-grouped classrooms with less advanced students, teachers can take more time to explain concepts, provide more individual attention and review, and can move at a pace geared to the students in the class, so those students can build a solid mastery of the core material.

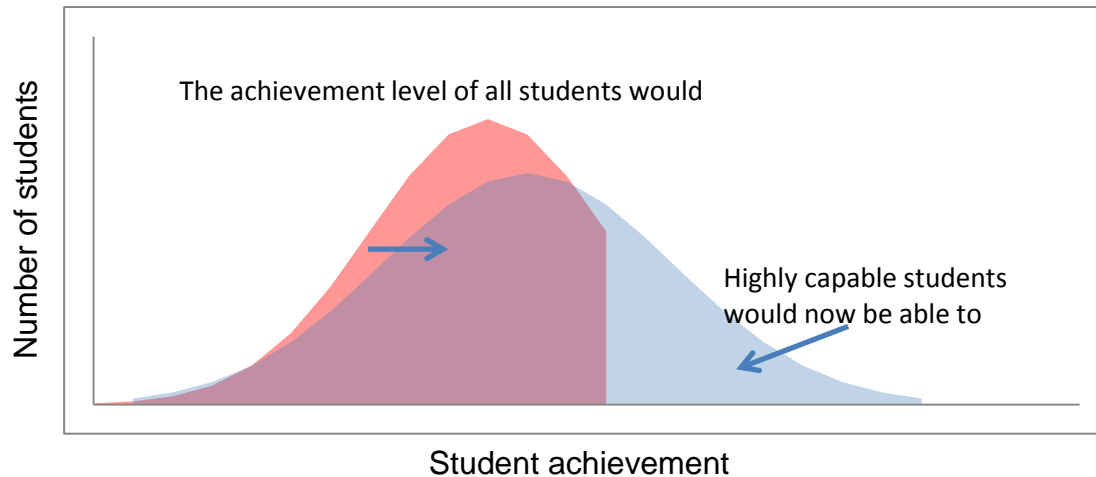
At the elementary level, this model could be implemented at the time students are assigned to their classroom teacher at the beginning of a school year. The Gifted Resource Teacher will be a stakeholder in the classroom assignment process. During the course of the school year, grouping can be fine-tuned by unit-based cross-grade reassignment of students based on teacher-administered pre-testing of unit content. A student's group for one unit would not determine placement for a different unit or a different subject. The curriculum for each unit would be adjusted to match the achievement level of the group, although every group would cover the standards of learning objectives for the unit.

At the middle and high school level, achievement grouping would occur by placing students in regular or intensified courses in subjects based on past performance and student preference. Grouping decisions would be made each year, as currently occurs with math placement decisions. While the school may recommend a placement for a student based on past performance, the student and his or her parents may request a different placement, if they believe the student needs increased or decreased challenge. Adding intensified level classes in core subjects at the middle and high school levels would allow students who need or seek

Commonwealth of Virginia regulations require that school divisions provide a continuum of services to students identified for gifted services. See 8 VAC 20-40-20

more challenge to learn a subject at a greater level of rigor and complexity. Appendix 2 is a chart of APS's current offerings in the four core subjects at the middle and high school levels, along with indications showing potential intensified course offerings where they are not currently available.

Without achievement grouping and intensified class options, Arlington in effect has truncated the bell curve of achievement for its students, such that achievement and educational opportunities drop off past the proficiency levels set by the Standards of Learning curriculum offerings.



The model of cluster-grouping and intensified course options proposed by the Committee would instead increase achievement across the spectrum of student abilities, raising the bar and allowing all children to advance academically and meet their individual potential. Although implemented differently at the elementary and secondary school levels, the purpose of these approaches is the same: allow students the opportunity to learn in an environment in which the teacher can target instructional complexity and pace commensurate with the achievement level of the students.

Estimated Cost to Implement Recommendations 2 and 3		
Recommendation 2	Achievement grouping of elementary students uses existing staff and decision methodologies	\$0
Recommendation 3	Instituting intensified course options should not require APS to hire any new teachers or otherwise increase budget expenditures	\$0

RECOMMENDATION FOUR:

In order to evaluate the implementation of the Gifted Services program across the school system, APS will report annually to the School Board on the implementation of the Local Plan for the Education of the Gifted.

An equitable, appropriate education for all students in APS requires consistent application of APS policies in each school. It is crucial that the APS administration know the extent to which the Local Plan for the Education of the Gifted is being implemented. And it is vital that the School Board receive the documentation it needs to exercise oversight of the APS system. Right now, sufficient information is not available to determine the extent to which policies and plans are being implemented consistently across the APS.

Accordingly, the Committee recommends that APS Gifted Services staff annually produce the following reports:

1. Gifted Identification Report. Report the number of students in each grade in each school who are identified in each of the four core areas of gifted identification (mathematics, science, social studies, and language arts), further detailed by gender, race and ethnicity. The report should be issued in July after new identifications have been made.

There is anecdotal evidence that some schools are largely identifying students in grades 3 and beyond, rather than in grades K-12 as required by the APS Local Plan for the Education of the Gifted, approved by the School Board in 2012. There is also anecdotal evidence that some schools are not identifying students in science and social studies in any elementary grade. Reporting by school, grade, and subject will help indicate the extent to which this is the case. Reporting by gender, race and ethnicity will help determine the extent to which an unbiased nonverbal ability test is narrowing the gap in gifted identification rates between minority and white students. (See Recommendation 1.)

What gets measured
gets done; what gets
measured and fed
back gets done well;
what gets rewarded
gets repeated.
—John E. Jones

2. Gifted Student Cluster Report. Report the number and size of clusters of gifted students in each grade in each elementary school. The report should be issued in November after classroom assignments are settled.

Reporting on the number and size of clusters of gifted students will help indicate whether school administrators and classroom teachers are following the policy of clustering at least five gifted students as an effective means of fostering student learning. Using cluster and flexible ability-grouping becomes increasingly important with larger class sizes. The Committee's previous work with focus groups of teachers documented the challenges of differentiating instruction in highly heterogeneous classrooms. (See Recommendation 2.)

3. Gifted Student Annual Progress Report. Report the extent of progress in the school system's efforts to measure the yearly progress of each gifted-identified student. The report should be issued in March (in order to space report workload).

In order to measure gifted students' progress, such measurements will likely require utilizing above-grade-level testing. Much work remains to be done to select an effective measure of progress, so this call is limited to a report on progress of that development effort.

It is impossible to know whether APS is meeting its objectives with respect to challenging all students without measuring the progress of individual students.

In the interest of greater transparency, we also recommend that the School Board make these reports public, which by commonly accepted standards can be done while protecting the identity of individual students.

Estimated Cost to Implement Recommendation 4		
Recommendation 4	Reports such as we recommend are inherent in the proper administration of a school system; generating these reports should not require APS to hire any new staff or otherwise increase budget expenditures	\$0

THE COMMITTEE:

We are immensely grateful to Cheryl McCullouch, the Gifted Services Supervisor and the Committee's staff liaison, for sharing her expertise in the field of gifted education and for her support, commitment and dedication to APS gifted students.

Michele Ginnerty, M.S. (Co-Chair); Robert Ramsey, J.D. (Co-Chair); Jane Englund, Ed.D., Herb Fontecilla, Ph.D.; Natalie Goldring, Ph.D.; Liz Hendrickson, B.F.A.; Tara Antonipillai, J.D.; Billy Bob Brown, Jr.; Josh Turner, J.D.; Selene Ko, J.D.; Bo Davis; Heather Coccozza, PMP/CPO.

Appendix 1: Survey and Analysis of Prior Recommendations

Recommendation	ACI Vote	Staff Response	Comments
<u>2012-1</u> Noted inability to fulfill our responsibilities because APS administration denied repeated data requests.	Report year: no ACI vote taken	Data requests denied at all levels of APS administration.	Denied data requests led Committee to meet with APS Superintendent.
<u>2012-2</u> Raised concern about draft "Local Plan," proposal to stop identifying students gifted in Science and Social Studies in grades K-3.	Report year: no ACI vote taken	Identification of students gifted in Science and Social Studies was reinstated in the 2012-2017 Local Plan for the Education of the Gifted	Success.
<u>2011 - 1</u> Consider achievement levels in class placements and provide intensified class options	Yes 24 No 7 Abstaining 1	Use CLASS data to determine changes, if any, to class options and groupings.	Early staff initiative may have dissipated, as the Committee has heard of no progress.
<u>2011 - 2</u> Base placements on objective measures	Yes 24 No 5 Abstaining 3	Funded purchase of K-8 Formative Assessment System. Study increased use of performance based assessments in secondary schools.	See 2009 - 4 and 2010 - 3
<u>2011 - 3</u> Apply APS differentiation policies consistently across schools and maintain staffing levels.	Yes 31 No 0 Abstaining 1	Use of planning factors remains unchanged and resulted in 3 elementary schools moving from 0.5 to 1.0 RTGs.	Consistent implementation of policies is a continuing concern. See 2009 - 3
<u>2010 - 1</u> Maintain RTG staffing levels	Report year: no ACI vote taken	School Board adopted budget that retained 500-student planning factor for 1.0 RTG. Additional elementary schools received full-time RTG positions due to growth in student population.	Increased RTG staffing levels represents a singular success. [Note: GSAC has recommended full-time RTGs in each school since 1999.]

<u>2010 - 2</u> Require use of data for determining instructional levels.	Report year: no ACI vote taken		See 2009 - 2 2009 - 3 and 2009 - 5
<u>2010 - 3</u> Implement quantitative measurement of yearly progress by students	Report year: no ACI vote taken		See 2007 - 2 2009 - 4 2010 - 2 and 2011 - 2
<u>2009 - 1</u> Maintain current full-time RTGs and add according to 500-student planning factor.	Yes 20 No 1	Staff recommended and School Board adopted budget that retained 500-student planning factor for 1.0 RTG. Additional elementary schools received full-time RTG positions due to growth in student population.	Success: RTG staff levels continue to benefit from the 500-student planning factor adopted by the School Board.
<u>2009 - 2</u> Increase gifted student clusters to at least five students	Yes 18 No 2 Abstaining 1	Data regarding current practices at elementary schools will be collected and evaluated. Also compared to new VA regulations.	Committee has seen no evidence of follow-through with this study.
<u>2009 - 3</u> Require principals to certify implementation of effective differentiation techniques	Yes 15 No 2 Abstaining 4	No change to current policy recommended.	See 2011 - 3
<u>2009 - 4</u> Require pre-testing and use of data for determining instructional levels.	Yes 19 No 1 Abstaining 1	No change to current policy recommended.	See 2010 – 2 and 2011 - 2
<u>2009 - 5</u> Encourage subject-specific and whole-grade acceleration for gifted students.	Yes 17 No 0 Abstaining 4	No change to current policy recommended.	

<p><u>2008 – 1</u> Fund a full-time RTG at each elementary school</p>	<p>Report year: no ACI vote taken</p>		<p>Report noted with appreciation the School Board decision to fund full-time RTG positions at the five elementary schools with 500 or more students.</p>
<p><u>2007 - 1</u> Fund a full-time RTG at each elementary school</p>	<p>For 10 Against 3 Abstaining 3</p> <p>Received 1st place ranking among ACI Major Initiative Assessment Ranking.</p>	<p>Noted that the issue of “overlay staffing” was being assessed by the Professional Development and Supplemental School-Based Task Group. No change to current policy recommended.</p>	<p>GSAC report noted that RTGs provide direct instruction to students at elementary level and are not “overlay staffing.”</p>
<p><u>2007 - 2</u> Investigate adoption of “value-added” testing to measure student progress</p>	<p>For 16 Against 2</p> <p>Received 4th place ranking among ACI Major Initiative Assessment Ranking.</p>	<p>Requested that Planning & Evaluation explore the concept based on presently available test data; suggested that “recommendation should be tabled” until Virginia P-16 longitudinal testing study was completed.</p>	<p>See 2009 - 4 2010 - 2 and 2011 - 2</p>
<p><u>2006 – 1</u> Reported on value-added and adaptive testing as indicators to measure the progress of gifted children and to assess whether differentiated instruction is accomplishing its goal of enabling each child to progress at least one year from the point of their mastery of material and skills at the beginning of the school year.</p>	<p>Report year: no ACI vote taken</p>	<p>No action was taken by School Board.</p>	

<p><u>2006 – 2</u> APS should assign a full-time Resource Teacher for the Gifted in each elementary school.</p>	<p>Report year: no ACI vote taken</p>	<p>No action was taken by School Board.</p>	
<p><u>2005 – 1</u> APS should assign a full-time Resource Teacher for the Gifted in each elementary school.</p>	<p>Unanimous support from the Advisory Committee on Instruction; ranked as ACI's top priority among fourteen major initiatives.</p>	<p>No increase in staffing of RTGs at APS elementary schools, despite APS Budget Study recommendations. The School Board approved \$15,000 in the 2005-2006 budget to fund current APS classroom teachers' attendance at gifted endorsement programs, to aid in recruitment of gifted resource teachers, with the goal of eliminating vacancies.</p>	<p>Summer 2004 Budget Study by APS staff endorsed full-time RTGs in each elementary school as its first time, but, due to budgetary constraints, recommended one full-time RTG in elementary schools with more than thirty-five teachers, and this would result in providing a full-time RTG in 15 of 22 elementary schools.</p>
<p><u>2004 – 1</u> APS should assign a full-time Resource Teacher for the Gifted in each school.</p>	<p>Report year: no ACI vote taken</p>	<p>Superintendent proposed and School Board approved full-time RTGs at the middle school level.</p>	
<p><u>2003 – 1</u> APS should assign a full-time Resource Teacher for the Gifted in each school.</p>	<p>?</p>		

<p>2002 – 1 APS should establish a five-year transition plan to have a full-time resource teacher in every school, beginning with the 2003-2004 school year.</p>	<p>Report year: no ACI vote taken</p>	<p>In 2000-2001 school year, APS had moved to 0.5 RTG staffing at each school in response to an outside evaluation of the APS Gifted Services Program by UVA, which had recommended that “if the (collaborative instructional) resource model is to be effective, the current rotation system [for RTGs] must be abandoned in favor of permanent assignment with one teacher per building.”</p>
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Appendix 2. Current APS Offerings in Core Subjects and Proposed Intensified Course Options

Grades 6 – 8

** = no additional offering recommended because APS already provides an intensified option

Grade	Math	<i>Proposed Intensified Math Options</i>	English	<i>Proposed Intensified English Options</i>	Science	<i>Proposed Intensified Science Options</i>	Social Studies	<i>Proposed Intensified Social Studies Options</i>
6	- Math 6 - <u>Math 6 Intens.</u>	**	- English 6 - Reading	<u>English 6 Intens.</u> <u>Reading Intens.</u>	- Science 6	<u>Science 6 Intens.</u>	- US - 1865	<u>US – 1865 Intens.</u>
7	- <u>Math 7 Intens.</u> - Algebra I - <u>Algebra I Intens.</u>	**	- English 7	<u>English 7 Intens.</u>	- Life Science 7	<u>Life Science 7 Intens.</u>	- 1865 - Present	<u>1865 – Present Intens.</u>
8	- Math 8 - Algebra I - Geometry - <u>Geometry Intens.</u>	**	- English 8	<u>English 8 Intens.</u>	- Physical Science 8	<u>Physical Science 8 Intens.</u>	- World Geography	<u>World Geography Intens.</u>

Intens = Intensified

Grades 9 - 12

** = no additional offering recommended because APS already provides an intensified option.

	Math	Proposed Intensified Math Options	English	Proposed Intensified English Options	Science	Proposed Intensified Science Options	Social Studies	Proposed Intensified Social Studies Options
9	- Algebra I, Part 1 - <u>Algebra I Intens.</u> - Geometry - <u>Geometry Intens.</u> - Algebra II - <u>Algebra II Intens.</u>	**	- English 9 - English 9 & World History Intens. (Block: must be taken together)	English 9 Intens.	- Biology - <u>Biology Intensified</u> - Earth Science	Earth Science Intens. (allow in 9 th as well as 10 th)	- World History - <u>World History Intensified</u> & English - AP World History	**
10	- All of the above - Prob & Statistics - Math Analysis Trig - AP Statistics - Pre-Calculus - <u>Pre-Calculus Intensified</u>	**	- English - <u>English 10 Intens.</u>	**	- All of the above - <u>Earth Science Intens.</u> - Chemistry - <u>Chemistry Intens.</u>	**	- World History and Geography - <u>World History and Geography Intens.</u> - Economics - AP World History - AP European History	**
11	- All of the above - Algebra II Principles - AP AB Calculus - AP BC Calculus	**	- English 11 - AP English Language & Composition	English 11 Intens.	- All of the above - Astronomy - Physics - <u>Physics Intensified</u> - AP Chemistry - AP Biology - AP Environmental	**	- All of the above - US & VA History - AP US & VA History - US & VA Government - AP US & VA Government	US & VA History Intens. US & VA Government Intens.
12	- All of the above - Multivariable Calculus	**	- English 12 - AP English Literature & Composition	English 12 Intens.	- All of the above - AP Physics B - AP Physics C	**	- All of the above	(see 11th grade)

Appendix 3. Related References

Colangelo, N., Assouline, S., and Gross, M. (2004). A nation deceived: How schools hold back America's brightest students. Templeton Foundation, West Conshohocken, PA.

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Rogers, K.B. (2006). A menu of options for grouping gifted students. Prufrock Press, Waco, TX.

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Winebrenner, S., and Brulles, D. (2008). The cluster grouping handbook: How to challenge gifted students and improve achievement for all. Free Spirit Press, Minneapolis, MN.