

No Child Held Behind: Educating the Mathematically Gifted in Order to Fulfill STEM
Jobs in America.

Mitchell Sutton

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Dr. Heather Hoover

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Abstract

Identifying and nurturing students that are mathematically gifted is a key task that must be faced now if the United States wants to stay competitive in a technologically expanding world. It is no secret that jobs in the areas of science, technology, engineering, and mathematics, or STEM jobs, are being created with a high demand for qualified professionals in these respective areas. Advanced mathematics is essential to each of these areas. However, it is impossible to find enough professionals with the math skills necessary to fill these positions, if students who are capable of learning the discipline are never exposed at an advanced level. The real issues are identifying mathematically gifted students and enriching their mathematical exposure to fulfill of future STEM jobs. I argue that through intelligence breakdown and evaluation of students' abilities within mathematical thought, the mathematically gifted can be rightfully identified in elementary school. After they are identified, they should be separated for math class where they will be exposed to a more strenuous mathematics curriculum. Students who have been identified as mathematically gifted will be put on a track that will not only include the same math topics learned by other students, but also, more difficult examples and more "real world" applications. By changing the way these students are educated, they will be equipped with the tools to tackle advanced mathematics and the other subjects included in STEM education. Having a selective group of highly capable math students entering college and the work force each year will lead to the fulfillment of the multitudes of STEM jobs being created now and that will continue to be created in the coming years.

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Jobs in America

From the creation of nuclear power to space exploration, most major landmarks in progress during the 20th century were fruits of American ingenuity. Today, our country continues to take pride in the idea of dominance over our enemies and our allies alike: the idea that our position in the world rankings is at the top, and that no country can replace us. However, since the days of American technological dominance, things have changed. According to international testing, American students do not score above students from other nations on standardized academic testing. In reality, American students have fallen behind with respect to the collection of industrialized countries in the world today. The academic struggles of American students parallel the rapid creation of jobs in the areas of science, technology, engineering, and mathematics: STEM jobs. US News and World Report reports “STEM jobs in the United States comprise close to one-fifth of all occupations” and are “projected to grow some 1.7 times as fast as other jobs” (Morella & Kurtzleben, 2013, p.1). These jobs rely directly on the availability of skilled professionals in the academic areas of science and mathematics. However, numerous studies report that American students at a variety of grade levels perform more poorly than students in approximately 20 other industrialized countries. Not only are America’s average scores lower than those of countries in Europe and East Asia, according to The New York Times, “only 7 percent of students reached the advanced level in math” (Rich, 2012, p.1) compared to almost 50 percent of students reaching the advanced level in some East Asian countries. Going hand in hand with these poor performances, is the fact that, “only 26 percent of our nation’s high school seniors perform at proficient levels or above in

mathematics . . . and nearly 40 percent of them [who have chosen STEM majors in college], switch majors, in what one expert has called “the math-science death march”” (Bennett, 2012, p. 2). Educators must quickly devise new strategies that lend a solution to American students who continually slip in science and mathematics and create vacancies across STEM professions.

At the heart of each STEM profession, mathematics is an essential key. Whether purely knowing the advanced levels of math needed or having an advanced ability to think logically and problem solve, advanced mathematics students are crucial to the fulfillment of STEM jobs. Mathematically gifted students can excel at these higher levels of mathematics needed to work in the most innovative STEM fields if they are trained properly. Therefore, advanced mathematics education is crucial to return the United States to the forefront of technological advancement and innovation through STEM fields. In order to fill STEM jobs in America, mathematically gifted students must be correctly identified by Grade 4 and then placed on a track that includes a more rigorous and in-depth study of mathematics through secondary schooling.

Mathematically Gifted Students as the Answer for STEM in America

When speaking to the recent shortcomings of American STEM education, William J. Bennett, former United States Secretary of Education and a current CNN Contributor, says that “for the future of our own GDP, economic well-being, and employer and employment needs, this is a disaster in the making” (2012, p. 1). STEM jobs are the key to the future of American economics and power. With growths in these areas of the job market, an estimated 1 million more college graduates in STEM fields will be needed than current economic forecasts predict (Bennett, 2012, p. 1). Although

approximations of up to half of all STEM jobs will not require a bachelor's degree, jobs on the cutting edge of innovation and advancement will certainly require the skills and expertise which come along with education past secondary schooling, and many times past undergraduate studies as well (Morella et al., 2013, p. 1). When it comes to brilliant new inventions or ground-breaking methods, the brightest students must fill those roles, and right now the United States is doing a poor job of properly training these individuals so they can realize their positions in innovation. One very popular solution to the shortage of top-notch STEM professionals, recommended by many employers, is to go about "immigration reform and [expand] the number of H-1B visas offered to skilled high-tech foreign graduates" (Morella et al., 2013, p. 3). Although this is not a bad way to temporarily fill the nation's STEM vacancies at the highest levels, this is not a sustainable solution to the true problem. By filling upper level STEM positions with foreign skill, America places its future in the hands of those who have underlying loyalties elsewhere. That's not to say the country is at grave risk for espionage, although in some cases this may be true, but rather it puts itself in a position of dependency on other countries with which it must compete in the very arenas that their skilled professionals are here to help the United States. Issues of keeping these professionals in the United States, and again filling positions once they retire or move back to their home countries arise with this proposed solution. The United States could very easily find itself back in the same hole it finds itself in today: America is not producing enough skilled individuals for STEM jobs – not because it doesn't have enough intelligent students - but because it is not educating its gifted students. Therefore, the solution to the problem is to properly educate gifted students.

Correctly Identifying Mathematically Gifted Students

Educators and their critics like to think that a successful way to identify mathematically gifted students is through the use of teacher evaluations. Teachers interact with their students on a daily basis and in a short time are able to identify students who succeed in the subject or seem to comprehend the information better than others. Surely the educator is in a position to see clearly which students obtain an uncanny ability to preform in the classroom. However, as identified by Coxbill (2013), “teachers’ ratings of students’ creative mathematical abilities are more useful as predictors of academic achievement and leadership potential than as predictors of [mathematical] creativity” (p. 180). More simply put, when teachers identify a student as potentially mathematically gifted, or creative, more times than not, they are simply just identifying students who will become “good students”. These students don’t necessarily possess a gifted ability for mathematics, but more than likely they are just smart kids who will do well in most or all school subjects. Furthermore, Coxbill (2013) argues that even students who do well in math early in school show no real guarantee to be mathematically gifted individuals (p. 180). Many times these students who earn good grades and understand math in the classroom or score high on some standardized tests, fit the category of smart students rather than mathematically gifted. Therefore, a method outside of teacher evaluation and use of math achievement must be implemented so educators can properly identify students who show mathematically promise or potential for mathematical giftedness.

IQ scores illustrate this point and offer an overarching benchmark for mathematical giftedness identification. Two of the fundamental testing components of an IQ test are logical mathematical ability and spatial ability. The logical mathematical

ability is a direct measure of an individual's ability to think logically and intellectual competence for mathematical thought. Spatial ability tests a "proficiency in the visualization of objects in three dimensions and the mental manipulation of them" (Murray, 2008, p. 25). Although spatial abilities are not directly related to mathematical thought, the ability to visualize and manipulate are two extremely important components to success in mathematical conceptualization. Each of these components of an IQ test shows an extremely high correlation to intelligence, usually between .7 and .9 (out of 1.0) depending on the specific factors in each test (Murray, 2008, p. 25). To further illustrate the shortcomings of teacher identification and some standardized tests, Murray points out that many academically gifted individuals, such as lawyers or English professors, "who consider themselves dolts in math," would not test to a gifted level in logical mathematical ability on an IQ test but certainly exceeded mathematical expectations in the classroom and on tests such as the SAT compared to the average math student (2008, p. 26). Teachers and tests identify these students as mathematically gifted because they are above the average in academic ability, which then bleeds into their performance in the classroom and on knowledge based tests. However, when ranked against individuals of STEM majors or professions, who have high logical mathematical ability, the separation of mathematically gifted and non-mathematically gifted individuals would become more apparent. For sake of illustration, take a physicist and a clinical psychologist and look at their respective accomplishments in mathematics through secondary schooling. Although it is not unlikely that a clinical psychologist may be mathematically gifted, a group of physicists would more than likely possess many more mathematically gifted individuals than a group of psychologists. Looking at an average individual from both of these

categories, surely both of these individuals would have made good grades in math and would be considered by their teachers and common standardized tests as good math students relative to the average student. However, if the mathematical abilities of the two individuals are scored along side each other with respect to logical mathematical ability and special ability, the physicist possesses a greater ability for mathematics. Therefore, IQ tests, especially broken down into sections that measure logical mathematical ability and spatial ability, are a clearer indicator of mathematical giftedness than teacher evaluation and knowledge based tests like the SAT or ACT.

Logical mathematical ability is a general category to use as the foundation of a method to identify mathematically gifted students. Therefore, a more specific list of qualities that compose logical mathematical ability must be identified in order to extrapolate it to the practical identification of mathematically gifted students. Somewhat convincingly, the work of Vadim Krutetskii, a Russian psychologist who explored mathematical ability in gifted children during the latter half of the 20th century, became the foundation for a thought structure of mathematical ability (Vilkomir & O'Donoghue, 2009, p. 185). Through his years of research, Krutetskii made many revisions to his structure and what qualities constitute mathematical ability. Vilkomir et al. (2009) presents a sufficient Krutetskii, four-part structure of mathematical ability, which includes obtaining mathematical information, processing mathematical information, retaining mathematical information, and having a mathematical cast of mind (Vilkomir et al., 2009, p. 185). The first three groups are directly related to the ability to problem solve - an indisputably fundamental process in mathematics. The fourth group is more specifically defined as interpreting one's environment mathematically, having high levels

of interest, and having a high level of concentration (Vilkomir et al., 2009, p. 186). These components seemingly translate a student's intellectual ability to giftedness in mathematics. More specifically, and arguably more applicable, than Vilkomir et al.'s use of a four-part structure, Chamberlin uses a revised version of Krutetskii's research and presents that mathematically gifted students identify with a structure of nine ways of mathematical thinking. Many of these are expansions of the original four-part structure but for application sake, these nine ways of thinking are more formulaic than the four general categories and, are therefore, more easily identified in a student. Chamberlin's structure includes: ability to formalize, ability to generalize, ability to operate with numerals and symbols, ability to use sequential and logical reasoning, ability to curtail, ability to reverse mental processes, ability to think flexibly, ability to use mathematical memory, and ability to work with spatial concepts (Chamberlin, 2010, p. 55). These approaches are what Kruteskii found to be the essence of mathematical thought.

Therefore, identifying students who are mathematically gifted entails identifying students who have a high capability within these nine categories. Chamberlin indicates, "it is not the case that all advanced students will be equally adept in all of the nine areas" (2010, p. 60). Take golf for example, not every PGA TOUR player has equal abilities in every aspect of the game. Some players are better putters than others, while some players are better chippers than others, but they are all still "gifted" golfers. The same reasoning applies to mathematical ability. Some students will possess stronger abilities in certain areas than others. Furthermore, some students will be stronger than others in every area or exceptionally talented in one area but not in others. Thus, students must be evaluated

on a continuum of these nine areas of mathematical thought, where the collective ability across the continuum indicates mathematical giftedness.

Applying these proper ways of identifying mathematically gifted students is a difficult task that may very well have countless possible methods of application depending on the numerous factors within each school or even classroom. Therefore, the goal must be to create a general structure or outline that can be manipulated and applied to each individual case across the country. Also, an important note highlighted by Vilkomir et al. is that “mathematical giftedness [is] not static but [a] developing property, very much dependent on the environment, available mathematical experiences and support” (2009, p. 184). Therefore, the outline must include a standardized test, which can be administered to students at various ages, that effectively identifies logical mathematical ability and spatial ability. Students today are no strangers to standardized testing, even as early of kindergarten or 1st grade. An IQ test could be administered during 1st grade and then every other year up through 9th grade to evaluate each student’s IQ, and within that, their logical mathematical ability, in order to begin identifying promising mathematical students. Students that score in the upper 10% (a relatively liberal definition of “gifted”) on IQ and logical mathematical ability would be identified as potentials for being mathematically gifted. The biannual testing compensates for the fluidity of mathematical giftedness and when it could blossom in each student while not increasing the amount of testing many school systems already administer, therefore, not dramatically affecting the cost of testing per year for a school system.

Once the hard analysis of test scores are assessed, they must then be combined with an evaluation of each student’s ability in Kruteskii’s nine ways of mathematical

thought. There are two options for this; either another set of standardized tests must be created to directly assess a student's abilities within each of the nine areas, or a standardized grading scale, a rubric, must be created in order for teachers to make graded judgments of each student. Obviously, in light of the failure of teacher identification to properly identify mathematically gifted students, an objective test would be the more clear-cut way to evaluate the nation's students within the nine categories of mathematical thought. However, this would entail a very expensive campaign of creating the test, testing the test, and implementing the test nation wide. When this becomes economically possible, it should be considered as the best method for identification within the nine ways of mathematical thought. However, until this can be done with less expense for the entirety of the American education system, combining the IQ test results with the standardized judgments of trained educators is an acceptable method of identification. Working through the nine ways of mathematical thought, teachers will grade each student on a scale from 1-10, according to the standardized rubric in each category and then take the sum of each student across the nine categories. Similar to the evaluation of IQ test statistics, students who are in the upper 10%, having a score of around 63 out of 90 or higher can be identified as mathematically gifted and should be recommended for placement in the advanced math curriculum. Students who only meet requirements in one of the two tests should be left to the judgment of the teacher, parents, and student, taking under heavy consideration their "mathematical cast of mind" (Vilkomir et al., 2009, p. 186). Students who do not score in the upper 10% of either evaluation should simply stay on the track that was already laid out for them. After two years, the process should be completed again and every student should be reconsidered as potentially mathematically

gifted. No student is ever locked out of the possibility for being mathematically gifted and by the time this process is completed a few times, those students who are indeed mathematically gifted will have been identified and put on track for the more advanced and in depth study of mathematics that is necessary for the STEM majors and jobs that they will be filing into after high school.

Social Issues Turned Education Fixes

With the separation of a special group of students, especially at a young age, comes the fear that students who are not identified as mathematically gifted will see themselves as bad at math and will respond to the subject in a negative fashion. Many fear that drawing distinctions between groups of students creates an atmosphere where bullying and feelings of inadequacies can flourish. However, is it not true that schools already see this? No matter the make up of any class or how the teacher may conduct class time, it is no secret to students who is good at something and who isn't. Students are not oblivious to their own abilities and the abilities of others relative to their own. Therefore, the separation of gifted mathematics students will not magically create new issues between students. These issues already exist in every school across the country and nothing is going to be able to make any student more or less ignorant of their abilities compared to other students in their school. The idea that students will think of themselves as bad at math because they aren't identified as mathematically gifted is one that won't be introduced with the separation of mathematically gifted students: it's there and is there to stay. However, the idea that students will respond negatively to math because of their belief that they aren't good at it, is one that the separation of mathematically gifted students may very well help combat. Today, students who are not mathematically gifted

are reminded of it every day in math class when the mathematically gifted students dominate the class time answering every question, getting better grades, and simply just acting like they are better than everyone else in the class. When integrated together, gifted students suppress non-gifted students. Non-gifted students then respond negatively to the subject and “shut off” during class causing them to not realize their potential for mathematics. The separation of mathematically gifted students can produce a classroom environment where non-gifted students can feel more secure and confident. Drastic differences in ability will not be present in the classroom and therefore, non-gifted students will be able to get what they need out of their time in the classroom while mathematically gifted students compete against each other during their own class time. Students will still be cognizant of differences in ability but they will not have to compete for education during class time. This then allows both groups of students to more fully develop their respective abilities in mathematics.

Creating a Curriculum to Captivate Full Potential

Upon the separation of mathematically gifted students, a new curriculum that allows for maximum growth and understanding within each topic must be offered to them. A curriculum of this sort would be a more rigorous and in-depth study of mathematics in every topic. From addition to applied calculus, mathematically gifted students would receive a deeper and more difficult study than average mathematics students. Application problems would be central to the curriculum, especially in secondary schooling because these are the problems which mathematically gifted students are being prepared for, in order to successfully fill upper level STEM jobs after graduation. However, in addition to forming guidelines and a curriculum, it is imperative

to talk about the educator in this situation. Today, America already faces a problem when it comes time to discuss teachers in the STEM areas. As Morella et al. (2013) emphasizes, “the future of STEM education requires better trained teachers – and far more of them” (p. 2). Bennett (2012) also believes that the education system must “recognize that teachers, especially in the early grades, need training in math so they can integrate it as much as possible into children’s school life and curriculum” (p. 2), and Stansbury (2009) bluntly says “what it really comes down to [...] is that you can’t teach what you don’t know and this is a large problem, especially with teachers in lower grade levels” (p. 73). And yet, ignoring the fact that much of the work needed to successfully educate mathematically gifted students to fill STEM jobs relies heavily on properly training educators is not an option. The issue must be addressed as part of the establishment of a new and improved curriculum for mathematically gifted students.

Although a shortage of teachers in STEM areas is part of the STEM problem in America already, training for the teachers who are present and for new teachers coming into the field already offered. Many people have said, and Bennett (2012) again highlights that the availability of “nonprofit organizations that are dedicated to supplemental training of teachers in STEM areas” (p. 2) is readily available. Giving an example of his assertion, Bennett (2012) points out that Chevron, although they are not a nonprofit company, “host[s] additional training for teachers” (p.3) in STEM areas through Project Lead the Way. Like many issues in the United States, the issue here is not that the resources and the desire aren’t available to make change, but rather that the resources need to be put to efficient and effective use on a large scale. If a specially-designed curriculum for mathematically gifted students is ever to be realized and effectively implemented, schools

must take advantage of the programs that are present and the resources that have been allotted to help teachers receive the additional training necessary for proper STEM education.

**Themes for a New Curriculum: Fundamental Knowledge, Answers to Why,
Application, Cooperation, and a Mathematical World**

The creation of a new curriculum, even for gifted students, must still include the introduction of fundamentals as the building blocks to more advanced exercises within each topic. Chamberlin (2010, p. 63) presents a four level structure to mathematics problems that can be extrapolated to the selection of problems for a mathematically gifted curriculum. Level 1 can simply be characterized as exercises. These are the “easy” problems that allow students to familiarize themselves with the procedure they are learning. Exercises are a necessity to higher levels of mathematical understanding. Math textbooks offer a plethora of exercises following the examples they give in each chapter/section to illustrate the concepts at hand. Many times, learning the fundamentals is a matter of completing enough exercises in order to grasp the concept and become comfortable with the material. Level 2 can be characterized as word problems. Problems of this nature ask a student to derive a meaning from the presented question then do the proper mathematics in order to solve for what was asked. Level 3, although still considered a word problem by many, gives instructions on what operations to do but then asks for an answer that may require deduction from the answer found by following the instructions. Problems like these make a student synthesize multiple mathematical operations and are more than one step unlike Level 1 and Level 2. Therefore Level 3 problems are more challenging than just simple exercises. Level 4 offers the greatest

magnitude of difficulty and extrapolation of mathematics onto a problem. Again, multiple mathematical procedures will be required and a grasp of the problem at hand must be obtained in order for students to appropriately apply the mathematical tools they possess to the problem.

Using this kind of leveled structure, a curriculum can be created that offers a balance of problems within each level. Although it is necessary for gifted students to spend time on exercises in Level 1, it is more important that they possess an ability to move through tasks in Level 4 as well. Therefore, the amount of time spent within each level, and the number of problems gifted mathematicians see within each level, should lean more strongly toward Level 4. Chamberlin (2010) highlights this by saying “academically advanced students in mathematics . . . need to have a mix of low- and high-level skills . . . with approximately 33% of the curriculum invested in low-level activities, approximately 67% of the remaining curriculum invested in mathematical problems and authentic mathematical problem-solving tasks, which could be divided evenly between the two emphases” (p. 67, 69). Gifted students need to be able to work fluently through all four levels of problems and should then possess ability across the entire continuum of mathematics problems. Creating a curriculum with this structure and then teaching mathematically gifted students with an emphasis on the upper levels will expose gifted students to the more advanced and complex problems that they will face in STEM fields after graduation.

After a student learns how to do a mathematical task, the student must know why it works. It is essential for deeper understanding that gifted mathematicians know why the math they learn works and what makes it work. Witzel, Ferguson, and Mink (2012)

argues “to progress in mathematics, students must possess both the knowledge of procedures and the concepts behind those procedure” (p. 90). It is not enough to show them the steps of how to do something, but for gifted students, “they must also understand why they are performing these steps” (Witzel et al., 2012, p. 90). That way if they “understand the procedures and the concept behind them, they are more likely to successfully progress to more complex concepts” (Witzel et al., 2012, p. 90). The ability for gifted students to progress to more complex concepts is the essence of a new curriculum so mathematically gifted students may realize their maximum potential and ultimately fill innovative roles in America’s STEM job market. This is a difficult task, which may very well be the biggest missing piece of American mathematics education today and it is not one that can be left untouched if mathematically gifted students are to realize their potentials.

Addressing why math works will yield its first fruits when gifted students begin to apply fundamental procedures to mathematical modeling exercises. All students, but especially gifted ones, need to be exposed to rigorous training in mathematical application, or modeling. Not only does application of mathematical concepts and operations lead to a deeper understanding and connectedness of the proposed math topics, it is also the foundation of a majority of STEM areas. By using mathematics concepts to solve “real world” problems gifted students will prove to themselves why math works. Because these problems require a firm grasp of a variety of concepts, students develop an understanding for how mathematics in its entirety is applicable to the world they live in. The working knowledge and application of mathematics then becomes the foundation for

each student's entry to upper level STEM fields where they will feel comfortable and capable to solve the problems they must face.

More than likely, the easiest theme to incorporate into a developed curriculum is cooperation. The curriculum must involve aspects of group work, including students and teachers. Students can easily work on problems in a group, especially difficult and lengthy application problems found toward the upper end of the exercise continuum, or Level 4 problems. Today's working professionals, from Google and Facebook to Chevron and Exxon Mobile, collaborate on projects in order to increase efficiency and produce the best product. Now more than ever it is true that the works of a single individual don't produce the next big break in any area, especially STEM areas. More times than not, teams of experts work together in order to create "the next great idea". Collecting the best ideas and manipulating them as a group, is simply the movement that has been seen across today's professional world. For mathematically gifted students to receive no exposure to the environment that they will one day need to thrive in, is unacceptable and it must be integrated into a formulated curriculum. Similarly, as these gifted students will experience in undergraduate and graduate school, some problems need to be worked on with the educator. The collaborative efforts of student work and teacher expertise and guidance is a common interaction seen after secondary schooling with professors as mentors or bosses in the workplace, yet it is rarely seen prior to college. Students must be exposed to working along side an "expert in the field" in order to learn how to interact in such a situation. Learning how to be effective and efficient within a group is a skill that must be developed sooner rather than later, especially for gifted mathematicians, if they want to succeed in their respective field.

Being cognizant that mathematics surrounds people every day is a reality that mathematically gifted students must be made aware of early in their education. Educators need to show their students that math exists outside the classroom. So many students ask “why do I need to know this” or “when will I ever need this in real life”. These are the questions that must be answered by educators through the proof to their students that mathematics exists outside the classroom. Elementary students can see addition and subtraction when they pay for lunch (although this example becomes less prominent every day as six-year-olds pay with credit cards) and calculus students can see that derivatives are necessary to maximize the area of their fenced in back yard while minimizing the amount of fence used and effectively minimizing cost. Witzel et al. (2012) suggests that teachers can “[transition] from using fingers to using concrete objects when teaching number sense [to get] children out of their seats to see that math exists beyond the classroom” (p. 92). By doing this, teachers allow for students to create a connection between the procedure and what it means (Witzel et al., 2012, p. 92). When students see that math surrounds them and begin making the connections between topic and meaning, they begin to truly understand and therefore apply mathematics to the problems that surround them in the world. The point is, and will always be, that we live in a world shaped by mathematics and it is imperative for the “shapers” of tomorrow always to be cognizant that mathematics surrounds them everyday and is integrated into every hour of life. By seeing math in the world, and further understanding it because of this realization, mathematically gifted students can see where their skills are applicable in the real world making it easier for them to finally apply those skills to the world when it comes time for them to fill STEM positions.

The United States needs more students prepared to fill STEM jobs when they graduate. For this to happen, educators must take a serious look at the education of mathematically gifted students. Mathematics is the foundation for nearly every STEM job and most certainly those that exist at the cutting edge of their fields. Providing an avenue for mathematically gifted students to push themselves to realize their full potential is imperative. The American education system must implement changes that include properly identifying mathematically gifted students and creating a curriculum that allows for their maximum potential to be realized. By making sure that no mathematically gifted students are held behind, the United States will see an increase of graduates in STEM majors and then more importantly, an increase of highly skilled professionals filling the upper ranks of STEM jobs across the nation. From the American Revolution to the War on Terror, the collective population of the United States has stood strong on an idea of unmatched power and might. As nations develop all around the world the quality of competition for global power will intensify. If the United States wants to maintain its position atop the rankings of global power it must make a change to the quality of students it is producing each year. It is only at this point that Americans will rightfully own their bragging right as the most dominant country in the world.

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