

Position 1: All eighth grade students should take Algebra 1.	
What are some facts that support this position	What are some facts that counter this position?
<p>1. Robert P. Moses believes that children must understand the language of algebra to attain full citizenship in a computer-dominated world (Morgatto, 2008, p. 215)</p>	<p>1. Students have different needs and their education needs to be tailored to their interests. Should students who do not plan on attending college be required to take algebra? (Morgatto, 2008)</p>
<p>2. In 1997 the U.S Department of Education stated that students who take higher-level mathematics and science courses are more likely to go to college than students who take lower-level courses in both areas (Morgatto, 2008)</p>	<p>2. One in four ninth graders fail to finish high school overall in the nation with other states coming in at a higher rate such as Nevada at 45%. Many educators site algebra as the main academic reason. Expecting all students to master algebra may cause more to drop out (Hacker, 2012)</p>
<p>3. In 1989 NCTM recommended that schools promote increased mathematics literacy for all students and shortly thereafter the U.S. Department of Education found that effective middles schools offered Algebra to eighth-grade students (Spielhagen, 2010, p. 214)</p>	<p>3. Community colleges also face a mathematics wall. Less than a quarter of their entrants passed the algebra classes they were required to take. Similar findings also were found at Appalachian State University as students take these classes multiple times and even though some do pass eventually many drop out (Hacker, 2012).</p>
<p>4. Smith (1996) proposed offering algebra in eighth grade to all students to address the decline in achievement in high schools in the U.S. This will help prevent students from doubling up on mathematics classes to take Calculus in 12th grade (Greene, Herman, and Haury, 2000).</p>	<p>4. Some eighth grade students are not ready to take algebra because they are at different levels of maturity and may not grasp the abstract concepts (Steen, 1992).</p>
<p>5. The Third International Mathematics and Science Study (TIMMS) found in 2000 that eighth-grade curriculum in the U.S is comparable to the average 7th-grade curriculum for other participating countries (Greene <i>et al.</i>, 2000)</p>	<p>5. Countries like Japan integrate algebraic concepts into early elementary school suggesting there is no developmental reason algebra cannot be taught before high school (Education Week - Sparks)</p>
<p>6. Algebra must be regarded as a milestone not a goalpost in the middle school curriculum (Spielhagen, 2010, p. 222)</p>	<p>6. Students who reach the eighth grade and are ready for high ordered math should be encouraged but not required to enroll in algebra (Wolk)</p>

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<p>7. Reframing mathematics curriculum should include more intense mathematics in the intermediate grades so that all students could study algebra in eighth grade to better help mathematics literacy for all (Spielhagen, 2010, p. 222)</p>	<p>7. Algebra concepts are not being introduced before eighth grade, so we are setting our students up for failure. In The Final Report of the National Mathematics Advisory Council it states that we must monitor what the teachers are teaching, and to adequately prepare students for algebra the curriculum must include: conceptual understandings, computational fluency and problem-solving skills (McKibben, 2008)</p>
<p>8. Algebra instruction would level the playing field and open the gates for those students who choose to take advantage of those opportunities (Spielhagen, 2010, p. 221).</p>	<p>8. Non-college-bound students should be able to take non-college bound curriculum. (Morgatto, 2008)</p>
<p>9. Long-term attainment emerged as a critical benefit of studying algebra in eighth grade. 77% of students were still enrolled in advanced math classes in 11th grade (Trigonometry/Math analysis). Conversely, 62% of grade 8 mathematics resulted students taking Algebra 2 in 11th grade. (Spielhagen, 2006, p. 36)</p>	<p>9. Twenty-four states now require students to complete three years of math courses before graduating from high school has proven to be counterproductive. Well there was an increase in students in enrolled in eighth grade algebra, there was also an increase in the number of students failing math 9th grade and there has not been a sizeable increase in the percentage of students who went on to enroll in higher level math courses. (Wolk, 2011)</p>
<p>10. Early algebra (in eighth grade) makes it possible for more students to take five years of high school mathematics. (Cathy Seeley-Past President of NCTM-Faster Isn't Smarter: Messages about Math, Teaching and Learning in the 21st Century-A Resource for Teachers, Leaders, Policy Makers, and Families)</p>	<p>10. The goal of mathematics education is not speed but understanding. Nothing in high school requires mastery of algebra so early. (Steen, 1999) And according to Dr. Brodkey (PhD from Stanford in Mathematics and Curriculum Education) stated (in an article published in Education.com) when a student is pushed to take a class (like algebra in eighth grade) he rarely acquires a life-long affinity for math. Instead he develops a desire to get out of math classes as fast as possible.</p>
<p>11. Algebra is, in Robert Moses' apt phrase, "the new civil right" (Moses 1995). Algebra means access. It unlocks doors to productive careers and democratizes access to big ideas. (Algebra for All in Eighth Grade: What's the Rush? Lynn Arthur Steen, St. Olaf College)</p>	<p>11. There is no social benefit from placing students in classes for which they are not prepared. Enrolling all unprepared students in algebra in eighth grade is counterproductive. Instead of an expansion of knowledge for students and preparing them for success in the future, you see the frustration of failure due in large part to the</p>

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	lack of preparation. This will lead to an increase in high school dropout statistics. (McKibben, 2008)
<p>12. Enrollment in gatekeeper courses, such as algebra, in eighth grade helps students reach higher levels in mathematics. (Do Gatekeeper Courses Expand Education Options-Robert Atanda-Education Statistics Quarterly- 1999)</p>	<p>12. In 2007, students in the District of Columbia scored last on NAEP, but had one of the highest percentages of students enrolled in Algebra 1 in eighth grade. Also in 2007, California had 60% of its eighth graders enrolled in Algebra and had one of the nation's lowest average scores on NAEP as well (Wolk).</p>
<p>13. Reaching higher levels in mathematics, combined with enrollment in eighth grade algebra provides students with an advantage being more likely to apply to a 4 year college than those who did not enroll in algebra in eighth grade (Atanda).</p>	<p>13. Labor experts say that the skills employers--even those in many high-paying fields--demands don't include the high-level math that policymakers are pushing for. In a survey 35 out of 51 employers stated that they require workers to know relatively basic math (Wolk).</p>

Position 2: All eighth grade students should not be required to take algebra 1	
What are some facts that support this position	What are some facts that counter this position?
<p>1. Students have different needs and their education needs to be tailored to their interests. Should students who do not plan on attending college be required to take algebra? (Morgatto, 2008)</p>	<p>1. According to industry wide standards, skilled workers like entry level automobile workers need to be able to apply formulas from algebra to properly wire the electrical circuits of any car. (U.S. Dept. of Ed. Article, Oct. 1997)</p>
<p>2. Some eighth grade students are not ready to take algebra because they are at different levels of maturity and may not grasp the abstract concepts (Steen, 1992)</p>	<p>2. In New York State, Assistant Principal Delia Grarity of South Side Middle School, along with the help of Superintendent William H. Johnson implemented universal acceleration in math. This acceleration saw a gradual increase in enrollments in accelerated math classes. Despite the enrollment increase, median scores on the Sequential I Mathematics Regents Exam</p>

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	remained stable and did not decrease (Burriss, Heubert & Levin, 2004)
3. Non-college-bound students should be able to take non-college bound curriculum (Morgatto, 2008)	3. According to industry wide standards, skilled workers like entry level automobile workers need to be able to apply formulas from algebra to properly wire the electrical circuits of any car (U.S. Dept. of Ed. Article, Oct. 1997)
4. Some eighth grade students are not ready to take algebra because they are at different levels of maturity and may not grasp the abstract concepts (Steen, 1992)	4. In a 2008 letter to the editor of the Ventura County Star, Professor of Education Dr. Bruce Mitchell argues against algebra for all by the end of eighth grade. His letter referenced the studies of Dr. Herman Epstein, who believed that the human brain had rapid growth periods and plateau periods where no growth seems to take place. For most students, the middle school years occur during a plateau stage, and Epstein argued that “the plateau stages were not optimal times for the introduction of new higher-level thought processes, particularly algebra, which eighth grade students fail more than any subject (Education.com)
5. One in four ninth graders fail to finish high school overall in the nation with other states coming in at a higher rate such as Nevada at 45%. Many educators site algebra as the main academic reason. Expecting all students to master algebra may cause more to drop out (Hacker, 2012)	5. Educators mostly lay the blame on students’ lack of career foresight and frivolous attitudes coupled with lack of parental guidance. Students are unfocused and directionless because of being developmentally immature. Students desire to have ample time to seek entertainment brought about by technological advances in such things as sophisticated cell phones, video games, internet, etc. Lackluster parenting styles may cause more to drop out (JETERAPS)
6. Some California universities only consider applications from students who have taken three years of mathematics and might exclude applicants who might excel at other fields (Hacker, 2012)	6. Reaching higher levels in mathematics, combined with enrollment in eighth grade algebra provides students with an advantage being more likely to apply to a 4 year college than those who did not enroll in algebra in eighth grade (Atanda)
7. Community colleges also face a mathematics	7. According to Wolk (2011), forcing students to

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<p>wall. Fewer than a quarter of their entrants passed the algebra classes they were required to take. Similar findings also were found at Appalachian State University as students take these classes multiple times and even though some do pass eventually many drop out (Hacker, 2012)</p>	<p>take four years of higher-order math when they have no interest in math and want to be artists or history teachers or a journalist is cruel and unusual punishment. Even if a little rubs off, it is probably a waste of time.</p>
<p>8. Mathematics teachers at every level could create exciting courses in what I call “citizen statistics.” It would familiarize students with the kinds of numbers that our personal and public lives. Mathematics departments should create courses in the history and discipline such as art and music. The aim would be to treat mathematics as a liberal art, making it as accessible and welcoming as sculpture or ballet (Hacker, 2012)</p>	<p>8. Reframing mathematics curriculum should include more intense mathematics in the intermediate grades so that all students could study algebra in eighth grade to better help mathematics literacy for all (Spielhagen, 2010, p. 222)</p>
<p>9. Relatively few students finish 7th grade prepared to study algebra. At this age, students’ readiness for algebra--their maturity, motivation, and preparation--is as varied as their height, weight, and sexual maturity. Premature immersion in the abstraction of algebra is a leading source of math anxiety among adults (Algebra for All in eighth Grade: What’s the Rush-Lynn Arthur Steen-St. Olaf College)</p>	<p>9. At South Side Middle in New York State, all students entering 6th grade took accelerated math to prepare them to take the Regents exam when they reached eighth grade. Research found positive results for all students. Teachers worked to revise and condense the 6th and 7th grade mathematics curriculum to prepare the students for the accelerated algebra course usually reserved for high achieving eighth graders. Working together, teachers eliminated redundant material and streamlined content (Burris, Heubert & Levin, 2004)</p>
<p>10. Even fewer eighth grade teachers are prepared to teach algebra. Most eighth grade teachers, having migrated upwards from an elementary license, are barely qualified to teach the mix of advanced arithmetic and pre-algebra topics found in traditional eighth grade mathematics. Practically nothing is worse for students’ mathematical growth than instruction by a teacher who is uncomfortable with algebra and insecure about mathematics (Steen)</p>	<p>10. Reframing mathematics curriculum should include more intense mathematics in the intermediate grades so that all students could study algebra in eighth grade to better help mathematics literacy for all (Spielhagen, 2010, p. 222)</p>
<p>11. Few algebra courses or textbooks offer sufficient immersion in the kind of concrete, authentic</p>	<p>11. Reframing mathematics curriculum should include more intense mathematics in the</p>

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<p>problems that many students require as a bridge from numbers to variables and from arithmetic to algebra. Indeed, despite revolutionary changes in technology and in the practice of mathematics, most algebra courses are still filled with mindless exercises in symbol manipulation that require extraordinary motivation to master (Steen)</p>	<p>intermediate grades so that all students could study algebra in eighth grade to better help mathematics literacy for all (Spielhagen, 2010, p. 222)</p>
<p>12. Most teachers don't believe that all students can learn algebra in eighth grade. Many studies show that teachers' beliefs about children and about mathematics significantly influence learning. Algebra in eighth grade cannot succeed unless teachers believe that all their students can learn it (Steen)</p>	<p>12. Research on high-level instruction supports the idea that an accelerated curriculum better supports low-level students than a low-level curriculum to enhance student performance and to support students who are at risk of failure. Current standard moves show that virtually all students can reach high levels of achievement if they are afforded high quality curriculum and instruction (Burris, Heubert & Levin 2004)</p>
<p>13. The Consortium on Chicago School Research studied revealed that while enrollment in algebra increased, the number of students failing math in the 9th grade increased as well. Therefore, requiring all eighth graders to enroll in algebra is counterproductive. (Wolk)</p>	<p>13. As a result of the math acceleration program at South Side Middle School in New York State, all students benefited. The research showed a statistically significant increase in the percentage of all students taking classes beyond Algebra 2 in high school. Implementing higher standards did not discourage even the initial low achievers.</p>

Summary and Recommendation:

In mathematics, there is a great debate happening among mathematics educators, mathematicians, and policymakers in the United States (U.S.). This debate questions if all eighth grade students should be required to take Algebra 1. This debate regarding algebra and high-order mathematics has become almost an obsession in mathematics education and policy making arenas today. Once reserved for gifted students, now more U.S. eighth graders take Algebra 1 than any other mathematics course (McKibben, 2008). In the early 1980s, there was a push to enroll all eighth graders into algebra as part of an attempt to increase international

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competitiveness by producing more math whizzes and to ensure that traditionally underserved middle school students were not shut out of any opportunity to attend college (Wolk, 2001). Since the 1980s, there have been two extremely strong opinionated research backed sides regarding this debate.

The question still remains, should all eighth graders take Algebra 1? One side of the argument promotes all eighth grade students take this gatekeeper of all upper level mathematics courses. The belief is that all students will be better prepared to enroll in more rigorous courses in high school, which in turn would ensure students being ready for college or the workforce. As a result, students would be mathematically equipped to transition and excel in an advancing technological world upon graduation from either high school or college. Expecting all students to complete Algebra 1 by the end of eighth grade is not only our moral, but also our ethical responsibility to ensure that our nation maintains its competitiveness with our global counterparts.

The other side of this controversial argument discourages Algebra 1 for all by the end of eighth grade. Some of the beliefs supporting this opinion are based on the students' interests, career foresight, and current knowledge ability levels. For instance, students who are not prepared with the knowledge and skill background to be successful in Algebra 1 should be able to enroll in classes that better prepare them and develop their confidence. Other factors to support this philosophy include a lack of student maturity and the mathematical background required to attain proficiency in eighth grade algebra. Mandating algebra for all eighth graders may also discourage students from taking other mathematics courses in the future, make the achievement gap even wider, or even contribute to the current dropout rate in high schools across

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the nation.

Recommendation

It is evident from the research provided that as more under-prepared students are placed in Algebra 1 as eighth graders, too many are unprepared and falling behind their higher-achieving peers as well as losing confidence that they can learn mathematics. Based on scores provided by the National Assessment of Educational Progress (NAEP), the Brookings reports (Loveless, 2013) contends that as many as 28% of those students enrolled are unprepared and lack the prerequisite skills in arithmetic. This report goes on to say that these unprepared students may harm the prepared students by causing the instruction to be weakened to compensate for all student needs. The report strongly recommends that enrollment in algebra should be based on readiness and not grade level. The Brookings Report found no direct relationship between the percentage of students enrolled in algebra in eighth grade and higher scores on the NAEP. Furthermore, the report found that scores were not higher in states with a higher population of eighth graders enrolled in algebra. Therefore, the report contends that there is no benefit to the policy of requiring all eighth graders to enroll in algebra. The report also asserts that as the number of eighth graders enrolled in algebra increased, there was a decrease in the average NAEP scores of those students. From this research we can conclude that prepared students in eighth grade algebra learn less given the presence of the unprepared students. (The National Education Policy Center, 2008). Therefore, requiring all students to take algebra in eighth grade does not benefit all students.

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