

Preparation Work Group

Research Brief

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The purpose of the current research brief is to explore more deeply two issues for discussion at the September 21, 2004 meeting:

- ***The High Expectations Standards, Curriculum, and Assessment Topic.*** This document includes additional background requested regarding standards and curriculum expectations of colleges. At the meeting we will have additional information regarding the states developing the “opt-out” provisions discussed at the last meeting by Achieve (students are on the college preparatory path unless they choose to opt-out.) While the issue of testing/assessment is central and in related to the development of standards, it is not discussed in this document. The rationale for this decision is simple: once the standards/curricular expectations are decided upon the issue of testing/assessment will become clearer.
- ***New Strategies for High School Success*** to help meet high expectations; material previously shared and amended with new information to introduce the rationale and examples of new high school success models, particularly to serve underachieving school/communities.

I. THE HIGH EXPECTATIONS STANDARDS, CURRICULUM AND ASSESSMENT

The Goals of Higher Standards

At one level, the goal of improving standards for completion of a high school diploma is clear: to better prepare future generations for entry into college or the workforce. As the American Diploma Project (ADP) and others (American Diploma Project, 2002; Association of American Colleges & Universities, 2002; National Commission on the High School Senior Year, 2000) have proclaimed very clearly, every student requires the same high level of academic preparation whether they intend to go to college or enter the workforce. Labaree however, suggests that several goals are imposed upon education that are frequently at odds (Labaree, 1997). It is important to recognize these goals and the tensions which may exist between them in order to develop a set of standards.

According to Labaree, society has defined three primary purposes for schools at all levels (Labaree, 1997). The first purpose is to achieve democratic equality. For the better part of the twentieth century, schools were the battlegrounds for racial, gender, and economic equality. School uniform codes were implemented to minimize the disparity of economic advantage among students, free and reduced lunch programs were established so that children would not have to go hungry, and students were bussed across districts to offset the effects of racial segregation. Recently, we have seen schools serve as battlegrounds over individual rights such as affirmative action in college admissions, prayer and the pledge of allegiance in schools, and the rights of gay and lesbian students to begin student organizations. This is in addition to the fact that schools have routinely been called upon to eliminate the achievement gaps between groups of students—that are in many respects, created before formal schooling begins. The most recent iteration of this is the NCLB legislation that not only expects all students to learn at the same high level, but also holds schools and districts accountable for closing the gaps among racial and ethnic groups of students. It is clear that democratic equality is one of the most prominent goals held for today's schools and it is designed primarily to achieve a public good that benefits all members of society.

Social efficiency is the second goal for education. Take, for example, the commission's charge to double the number of college graduates in the state and more closely align higher education and economic growth. The purpose of education, according to this goal, is to prepare each student for

their place in the job market. It recognizes that students learn at different levels and have different aptitudes and aspirations and that society is best served by training them for productive careers. Social efficiency also achieves a public good because roles must be filled and education is the place to define who will fit into which roles. Take, for example, the vocational education movement in K–12 education. In the 1970s and 1980s, the proliferation of elective course offerings in high schools prompted a new term, the shopping mall high school (Powell, Farrar, Cohen, National Association of Secondary School Principals (U.S.), & National Association of Independent Schools. Commission on Educational Issues, 1985). In this version of the high school, students had virtually limitless options for courses, majors, and careers. Many of these courses were designed to serve those students who were unlikely to pursue a college degree and had a different set of skills and abilities that could be developed for participation in the workforce.

The final goal is best understood as the American dream. Education has become the vehicle for social mobility in the United States. Americans have an unwavering belief that if you work hard you can achieve anything you set your mind upon. It helps that the Bureau of Labor Statistics and others regularly publish the economic benefits of each new level of education attained. For example, an individual over the age of 25 who has a professional degree earns more than twice as much annually, on average as someone with no more than a high school diploma (Bureau of Labor Statistics, 2004). Colleges across the country sell students on the idea of college by appealing to their desire to earn more money, get a better job, and find happiness in a future career. This purpose relies upon the American belief in merit, which can be found in our reliance on test scores for college admission, grade point averages to approximate mastery of course material, and the proliferation of high-end courses like AP, IB, dual enrollment for high-achieving students, and early high school completion programs. Whereas the other two goals serve a public good in very different ways, this goal for education is distinctly individual.

The challenge is to consider critically what the goal of education is in the state of Michigan. Can we achieve equality in an inequitable society? Is social efficiency a worthwhile goal and do individuals stand to benefit to the same degree as society? Are schools intended to be the vehicle for achieving the American dream? Is education a public or a private good, or some combination thereof? These are fundamental questions that should inform the nature of the standards implemented by the state of Michigan. If the goal of education is to level the playing field, then the curriculum should be rigorous and demanding for all students and every effort should be made to provide supplementary help so that lower achieving students receive the same high mark. If the goal is social efficiency, then testing should be more rigorous and discriminating and course offerings should span the range of career and vocational offerings that complement the local workforce needs. And if the goal is social mobility, then options for early completion and dual enrollment should be complemented with rigorous and differentiated curricular tracks that allow students choices based upon where they intend to go next.

The Dimensions of Standards

Standards are largely in the eye of the beholder. In order to define high standards for high school graduation, it must be clearly understood for whom they are being developed and for what purposes they are being used. On one level, standards are set so that students know what they are expected to accomplish while in high school. Students are arguably the most important constituent of education but a second and equally important group to consider is educators. Standards should communicate to school districts, high schools, and teachers what they are expected to teach to ensure that students are maximizing their high school experience. Finally, as

recent efforts have underscored, colleges, universities, and employers represent another vital audience for standards reform. In combination with the workforce, higher education establishes a de facto set of standards by virtue of what they expect from a college applicant or a job applicant. Any set of standards adopted should be able to speak to the needs and expectations of each of the three constituent groups.

The dimensions of a set of statewide standards flow logically from the three groups who are most directly affected by a change in high school standards. The first dimension of state high school graduation standards is the number of credits required to earn a diploma. Since 1983 and *A Nation At Risk* (National Commission on Excellence in Education), there has been a steady increase in the number of credits a student is required to complete in order to earn a high school diploma. A high school credit is generally defined as one hour of seat time per day for an entire school year and there are typically a total of 24 available credit hours in a student's expected curriculum. There is considerable discussion about the duration of a class period, but it falls beyond the scope of this brief. New York, for example, began with a moderate expectation of 16 credit hours, mostly in the core curricular subjects of math, science, English, and social studies (New York State Education Department, 2002). During the mid-1980s, New York increased the number of credits required for a degree to 18.5; subsequent to the implementation of No Child Left Behind (NCLB), New York has increased the number of credits once again to 22 (New York State Education Department, 2002). Texas (Texas Education Agency, 2004), Florida (Florida Department of Education, 2004), and others have followed similar trajectories.

Typically, the number of credits is disaggregated by subject area, particularly in the core subject areas. For example, a particularly rigorous standard like that of Florida may require 24 credits including 4 units of English, 3 units of math, 3 science, 3 history, and a combination of electives and localized course requirements such as health and physical education (Florida Department of Education, 2004). The appeal of such an approach is simplicity. It is clear to every student and parent what must be completed in order to earn a credential. Educators however, quickly recognize that this standard alone is limited.

The second dimension elucidates the first. While a greater number of credits may be a part of the story, it clearly fails to recognize that not all credits are the same and they certainly do not approximate the same levels of learning. At the heart of NCLB, irrespective of its utility as a policy tool, is the notion that all students can learn at the same high level (Department of Education, 2002). Three years of math ensures that each student will take three math courses in high school, but with the sizable number of course offerings, there is no guarantee that all students will have the high rigorous standard. As a result, many are coming to advocate a more nuanced approach that recognizes the importance of the number of credits and the courses within which those credits are earned. For example, Achieve, Inc. recommends three years of math including Algebra I, Geometry, and Algebra II (American Diploma Project, 2002). Similarly, Florida has established that while 3 social science credits are necessary, they must also be earned in American History (1), World History (1), Economics (0.5), and American Government (0.5) (Florida Department of Education, 2004). The quality of courses taken is a particularly appealing dimension for colleges, universities and employers, because the specific courses balance the simplicity of a required number of credits with the complexity of approximating student learning.

The third dimension of high school standards should necessarily be set at the level of learning. In the past decade, there has been a considerable effort on the part of educators to refocus their attention away from what is taught and toward what students learn. Specific courses represented what schools and teachers taught, but they were essentially devoid of what was expected for

students to learn. In 1996 Michigan established and published a set of curricular frameworks that specifically delineated a set of intended outcomes for students learning by core subject area and by level in education (elementary, middle, and high school) (Michigan Department of Education, 1996). The frameworks are written with educators in mind and they establish clearly what districts should use to develop their own school curricula. The emphasis on student learning is critical and standards along this dimension are important for teachers and educators. Any educator will readily admit that there is more than one way to teach any course, no matter how specific the title, and without knowing what students are expected to learn, it is difficult to know if all students are learning what they need to succeed.

Clearly, the most complex dimension of high school standards is the third and final one focused on student learning and it is also most appropriate for educators. But, a curriculum framework translates less well for colleges and universities in the admissions process—given that higher education is also based upon a credit system—and even worse for students and parents. It would be difficult for students to read the curriculum framework and know what they needed to accomplish in order to complete high school. They may also find it difficult to say whether they learned what the frameworks suggest without some other form of assessment (i.e., a test or a portfolio). For this reason, it is important to consider all three dimensions when crafting a comprehensive set of expectations for high school completion. The frameworks, however, may have the most direct appeal to businesses and employers who are primarily interested in the set of skills a prospective employee has developed.

The following table is an illustration of how standards differ along these several dimensions, depending upon the audience. Colleges and universities, for example, emphasize different course levels and credit requirements than high schools. And Florida is an example of how one state has written its high school graduation requirements to serve as guidelines for each district in the state. Each of the areas listed below will be discussed in greater detail, but a note should be made regarding the American Diploma Project: to date, it has established benchmarks for math and English, but has not yet done so for the other core subjects. Consequently, its expectations would be much higher if it was clearly established in each of the areas.

High School Graduation Requirements According to Several Institutions

	Michigan State University	University of Michigan**	Grand Valley State	East Detroit High School	Huron High School	President's Council	Florida	American Diploma Project
Total Credits	14*	20	22	23	21	19	24	
Math	3 years including intermediate algebra	3 years	3 years including two years algebra	3 years	2 years	4 years including intermediate algebra	3 years math with at least Algebra I	3 years of math including Algebra I, Geometry, and Algebra II
English	4 years	4 years	4 years	4 years	4 years	4 years	4 years including composition and literature	4 Years
Science	2 years of college prep science from biology, chemistry, physics, and Earth Science	3 years	3 years including 2 years of laboratory science	2 years	2 years including one biological and one physical science	3 years including one year biological and one year physical science	3 years including at least two lab components	
Social Studies	3 years social sciences including history	3 years	2 years social science	3.5 years	3 years	3 years including one year of world history and one year of American History	3 years including one year of world history and one year of American History	
Foreign Language	2 years of a single foreign language	2 years***	2 years of a single foreign language	2 years of fine arts, foreign language, or vocational technical education		3 years of a single language		
Fine Arts						2 years		
Health Education				0.5 years	0.5 years			
Life Skills Management							0.5 years	
Physical Education				0.5 years	1.0 years		1.0 years	

*MSU listed no minimum number of credits so this number represents the sum of the minimum requirements by subject area

**U of M requirements are based upon those criteria established for the Literature, Science, and the Arts (LSA), requirements change for other schools

***U of M requires 2 years of Foreign Language but strongly encourages 4 years

NOTE: Saginaw Valley State University, Eastern Michigan and others stipulate that a student must have a high school diploma or its equivalent

Working Toward a Common Standard

At first glance, it may be easy to conclude that there is little difference among the several approaches to delineating high school graduation requirements. Most require between 19 and 24 credits to earn a diploma and the numbers are close in the core requirements of English, math, science, and social studies. In fact, contrary to what one might expect, the two high schools—East Detroit and Huron—have among the highest number of credits required. In terms of the first dimension, the standards—the number of credits—the differences are marginal with one notable exception. Neither high school requires a foreign language and yet all three colleges on the list require at least two years of a single language.

Let me make a quick note about the institutions included on the list, as it is relevant to the development of standards for the state. I looked at eight of the public four-year institutions and of those eight, only three listed specific course requirements on their admissions websites. It is possible that at least one or two publish course requirements, but in an age of the internet and electronic media, the web is becoming a primary source of information for prospective students. Several of the remaining pages specified that an eligible candidate simply possess a high school diploma or its equivalent. Community colleges were not considered in this list because, with few exceptions, they are open enrollment institutions that also require only a high school diploma or its equivalent. Three independent colleges were considered, including Marygrove College, which stated: "Successful completion of a high school college preparatory program preferably includes courses in English composition, literature, history and social studies, mathematics, and laboratory science. Foreign languages, computer science courses, and solid academic courses from elective areas will strengthen your preparation." The two remaining independent schools either did not specify course requirements or mentioned simply that the courses completed in high school would be considered in the admissions process.

There is another reason to use the three universities in the table as benchmarks for the state. Each is among the most selective in the state in terms of admissions and the stated goal of the commission is to double the number of college graduates in the state. If these standards are sufficient among the most selective institutions, they should also approximate an adequately high standard for students whether they pursue a college degree or enter the workforce. The underlying assumption, as has been readily discussed among this workgroup, is that many high school graduates are under-prepared to succeed in college (Greene & Forster, 2003). To a lesser extent, these three institutions were selected precisely to answer the criticism that colleges and universities are not very good at communicating their expectations to high school guidance counselors, teachers, parents, and students. They represent the few concrete examples of what universities in Michigan expect from prospective students.

Having said that, it is important to consider that both high schools on the list require more credits (dimension one) than either Michigan State University or the University of Michigan. There are two principal reasons for this seemingly contradictory finding. First, consider the footnotes listed below the admissions requirements for the University of Michigan:

1. Ideally, students will have completed five units during each of the four years. Also, students should elect Advanced Placement, International Baccalaureate, honors, enriched, and accelerated high school courses when appropriate and possible.
2. Students are urged to complete at least two rigorous writing courses.
3. Students are encouraged to complete at least two laboratory science courses.
4. Students are advised to elect "other" courses from the five subject groups listed. Examples of "other" courses include music, art, industrial arts, business education (including typing), home economics, physical
5. **Freshman applicants to the College of Literature, Science, and the Arts are REQUIRED to have completed the following: 4 years English, 3 years mathematics, 2 years biological and physical sciences, 3 years history and social sciences, 2 years foreign language.**
6. Students entering the College of Literature, Science, and the Arts are strongly encouraged to take four years of language study, but only two years are required for admission.

7. Students entering the College of Engineering should have completed four units of mathematics and at least one unit each of chemistry and physics.
8. Students entering the School of Nursing must have completed three units of mathematics including second-year algebra, and two units of laboratory science including chemistry.

The University of Michigan at first appears to require both fewer credits and less specific levels of courses (dimension two). However, when you consider the footnotes, U of M appears to have more rigorous requirements, as one would expect. For example, it recommends explicitly that students should take AP, IB, and other rigorous courses when they are offered. This is more explicit about rigor than any of the standards considered. The second reason may best be illustrated with the standards set forth by Michigan State University. Whereas high schools are operating within a framework of filling essentially 24 units per four-year high school career, colleges are interested only in courses completed in the core academic subjects. It may have appeared odd that MSU required only 14 credits, but those 14 credits represent a rigorous and demanding curriculum in the core subjects. You will notice that none of the colleges require life skills, physical education, or even fine arts. While those courses contribute to whether a student is well rounded (and will be looked at in the admissions process), they are not central to the academic preparation a student is likely to need in order to be successful at the college level.

If the goal of education is democratic equality, then the high standard represented by what the colleges and universities expect should provide an adequate benchmark. However, it is important to recognize that this goal runs counter to the notion of social efficiency because with that goal in mind, not everyone needs the same level of preparation. Even if everyone goes to college, a large number will not need the same high level of preparation that GVSU, MSU, and U of M require. And from a social mobility perspective, the high standard may even prove to be detrimental because it will make earning the high school credential more difficult and may lead to either more students dropping out and pursuing alternative certification or the development of alternative tracks to a degree, which is currently not permitted under NCLB.

The standard set forth by the Presidents Council, State Universities of Michigan (PCSUM) does not differ tremendously from those of the universities, in part because it represents those same institutions (Presidents Council, State Universities of Michigan, 2000). But it also represents the 12 other four-year public colleges in the state, some of which do not specify number of credits or rigor of curriculum beyond what the districts themselves establish. Given that the majority of full-time students attend the four-year public institutions, this would be an appropriate standard to consider. In addition to requiring a high number of courses in the core subjects and specifying appropriate rigor in math, science, and foreign language, the Presidents Council also recommends 2 years of fine arts as recognition that there is value to taking courses that fall outside the periphery of the academic core.

The Florida Example

Florida has established a highly proscriptive curriculum and provides a unique example of how such a plan can be implemented and which tradeoffs will be necessary. The state has essentially begun with the assumption that every student will complete all 24 units, which should be a part of a four-year curriculum. It is a demanding standard but if every student stays in school four years, this is the number of credits they should complete, assuming no failed courses or remedial

requirements.¹ However, the minimum level of math required is much lower than any of the other standards in the table at Algebra I (Florida Department of Education, 2004).

In addition, Florida has a set of curricular frameworks outlined in the Florida Sunshine State Standards,² similar to those set forth by academic level in Michigan. The frameworks do not appear as thorough as those in Michigan, but they establish similar expectations of what students should learn by course area and level in school. There are two characteristics of the Florida system that are particularly informative. First, Florida recognizes that not all students are prepared or able to succeed at one high standard in all subjects, so it establishes variations that appeal to the high achieving students as well as those with Individual Education Plans (IEP).³ The Florida plan establishes an 18-credit accelerated graduation program that specifically prepares students for college and those course requirements are aligned with the state university admissions standards (Florida Department of Education, 2004). The difference is primarily the number of electives a student is required to take. In the general plan, students must complete 8.5 units of elective credit, while in the accelerated program that number drops to 3 units.

For students with disabilities, the requirements vary depending upon the need. For example, an IEP could designate less rigorous alternative courses to complete the core requirements. The school district may also decide to waive the Florida Comprehensive Assessment Test (FCAT) as a condition for graduation. This approach is based on Labaree's notion of social mobility where individual merit defines the level at which a student is likely to complete their education. In this approach, there is an inherent belief that earning the credential, even when it approximates different levels of learning, is an important individual benefit. The approach Florida has adopted recognizes the competing goals mentioned earlier and it illustrates the tradeoffs a system must consider when the standards are set high.

Curricular Content Standards

The Florida and Michigan curricular frameworks are important documents that go to the heart of the issue: what students learn. The advantage of using courses to approximate requirements for diploma completion is that courses are simpler to quantify and translate into admissions expectations. The curriculum is organized around courses and students know exactly how many courses are required for them to attain the credential. However, the course should translate into some measure of learning and that is the purpose of crafting a curriculum framework. Teachers and administrators responsible for crafting and implementing the curriculum may differ on the way a course is taught or what is emphasized through the content, but the framework ensures that students learn a common set of skills and aptitudes. Consider the portion of the Michigan curriculum framework included as Appendix 1.

The mathematics section begins with a vision for what high school students should be able to do in math by the time they graduate. Those skills are captured in a series of strands and sub-standards that delineate what sort of thinking should occur with examples of how that might be accomplished in the classroom. This framework gives teachers guidance as they craft their lesson plans and decide upon the methods they may utilize to make the material relevant and understandable. In the math section, there are 6 strands that represent 15 content standards. Each of those standards should be an integral part of the curriculum and they should be measurable through a statewide assessment—the MEAP in the case of Michigan. Achieve, Inc. has

¹ It happens that in Florida, a student may take up to 9 units, of remedial work, which count toward electives.

² The Florida standards can be found at <http://sunshinestatestandards.net/>

³ An IEP is established for each student determined to have special needs

established a similar set of frameworks—referred to as benchmarks in their work—for English and math. The benchmarks are based upon in-depth research conducted in five states that considered what colleges and employers expected of high school graduates. The primary finding was that colleges and employers held a similar set of expectations in terms of the skills and abilities a graduate should possess. For example, Achieve found that each student should have a curriculum and a series of standards set approximately at the level of Algebra II.

Conclusion

Establishing a set of rigorous standards for high school completion in the state of Michigan that extend beyond the scope of the 1996 curriculum framework is a bold and necessary proposition. The Achieve, Inc. model is one way to think about a set of standards for the state but the primary message is this: colleges and the workforce hold a similar and high set of expectations for high school graduates and those expectations must translate into a more demanding and clear set of requirements for the completion of a high school diploma. The American Diploma Project may be the right approach to take as a way to ensure that the current Michigan curricular framework is consistent with the learning that is expected of students, but a consideration of models such as Florida and the admissions requirements of the four-year institutions in the state will help to insure that whatever standard is set for high school completion prepares students for the next level. Each of the three dimensions of high school standards are important to consider because they speak to the needs and responsibilities of different constituent groups. The number of credits and the level of courses required will fulfill the needs of students and parents who desire more than anything to know what they need to complete to succeed while the curriculum frameworks will inform the work of schools, districts, and teachers as they operationalize the curriculum and eventually establish appropriate assessments.

II. NEW STRATEGIES FOR HIGH SCHOOL SUCCESS—*new research-based approaches such as small high schools and blended institutions, career academies, other contextualized learning environments to increase the performance of students in districts that currently have low levels of educational attainment.*

With high integrated academic and skill expectations embedded in a core curriculum and linked to college, work, and other “next steps,” many schools, particularly at the high school level, will be challenged to succeed. There is good evidence that the focus on standards and curricular alignment to help all students, including poor students, achieve high standards has paid dividends in Michigan in grades K–8. There is a growing recognition that significant work must be done at the high school level, where performance has been poor, to re-conceive these institutions to improve learning and learning outcomes.

Michael Cohen of Achieve (who presented last week to the work group) describes it:

“The main discussion around high school redesign these days tends to focus on:

- aligning standards, assessments, curriculum, and course requirements with the demands of postsecondary education and work, a topic you have been discussing;
- creating small, focused, autonomous, and accountable high schools, as opposed to large comprehensive high schools
- the idea of “multiple pathways”—creating a variety of learning options and choices for students—from traditional academic programs to tech-prep to theme-based schools such as health-care focused academies, to early college programs that combine high school and

college coursework each of which provides a rigorous curriculum aligned with standards discussed above

- a whole set of capacity issues, which essentially boil down to figuring out how to find or develop school leaders and teachers who have the right stuff to teach really challenging material to all kids.”

There is a growing body of literature on all of these issues (some now made available on the website).

To reach our goal of more Michigan citizens “to and through” postsecondary education or relevant workforce training (e.g., apprenticeship, technical training), Michigan must first improve its completion rate of high schoolers and their successful transition to career-building postsecondary education or work. To do this, we must ensure that the high school experience has meaning, is motivating for students, and gives them direction for their future. High schools are large, boring, impersonal, disconnected from life, and the senior year is largely wasted. Michigan must improve the *relevance of high school*; making sure high schools work for kids, create learning environments that engage, are personalized, have self-generated, entrepreneurial, and contextual learning built into the experience.

A number of promising practices have emerged building on these principles:

1. **Blended Institutions**—Blended institutions are an attempt to collaborate between a high school and a local area college—typically a community college. Through this partnership, the college offers high school students the opportunity to take college-level courses and earn college credit, while simultaneously earning credit toward their high school diploma. In exchange for providing the advanced courses, the school district covers the cost of the tuition, which in some cases is negotiated to be lower than the actual cost of tuition. For many, this practice is referred to as dual enrollment.

Initial programs in this group focused on the needs of high achieving students who were either ready for college-level work or had exhausted the high school offerings for college preparation. **Consider Jamestown Community College (JCC) in New York State.** JCC began by offering summer courses to all of the college prep students at Jamestown High School and those from adjacent communities in its service area. JCC has expanded these offerings to provide distance courses that are offered via the web to local high schools during the school year to serve the same high achieving population of students. It is essentially a cost-sharing mechanism for the districts and a revenue stream for the community colleges. The schools that participate could not afford to offer a full AP curriculum but they could pay to have that offered through the community college. At the same time JCC was challenged by lower enrollments because of an aging population and this was one way to maximize the use of their faculty while bringing in the revenue necessary to cover costs.

More recently, there has been a move toward developing blended institutions as a key strategy for helping at-risk and middle range high school students reach higher levels of achievement and college aspiration and success.

Expanding from initial models such as the **LaGuardia Middle College in NYC**, research on middle college high schools indicates these comprehensive programs are successful with at-risk students. Graduates do better on state assessment tests, graduate from high school at higher rates than peers, and do better in college. (Bailey/Karp 2003).

Attending the workgroup meeting will be representatives from **Consider Washtenaw Technical Middle College in Ann Arbor**. This is a high school partnership with Washtenaw Community College (WCC) where students begin taking high school courses in the core subjects and by their junior year they are taking career focus courses and a college courseload that will either result in or place them on the path to completing an associates degree at WCC.⁴

Early College High School—Middle College's success has prompted funders such as the Bill and Melinda Gates Foundation to pledge over \$40 million to start 70 new middle college high schools (called Early College High Schools by the Foundation). Gates, the Walton Foundation, and others including Michigan's W. K. Kellogg Foundation, have invested considerable money and resources in this approach to improving the life chances of under-represented students. The early college is similar to the middle college but takes the integration of the college curriculum a step further. In this model students complete a full two years or an associates degree by the time they complete high school (Hoffman, 2003).

Michigan has one leading example—**Mott Middle College**. This program is a middle college/high school for at-risk youth in Genesee County, as well as districts geographically adjacent to Genesee County. Open to students in all 21 public school districts, Mott Middle College (MMC) is designed to provide "intensive care education" to students with academic potential at risk of dropping out before graduation from high school or who are achieving well below their potential. The middle college approach recognizes that these students are not likely to attend college if they are not given additional attention and support. Educators promoting this model believe that students must aspire to college, and one way to infuse this is to give this group of students a series of attainable goals that reinforce that they can succeed at this level.⁵ MCC has sent 84% of its graduates to college. They have maintained a 3.0 GPA, and have a drop-out rate of only 4.6%. (MCC's Principal Cheri Wagonlander is a national leader in the middle college movement and while unable to attend the work group meeting, is available to support the work group.)

2. **Schools within Schools**—During the 1980s and 1990s, there was considerable attention paid to defining what constituted an Effective School. For many years the size of the learning environment was frequently questioned, but it was not until recently that there has been an effort to figure out whether class or school size matter. There is considerable correlational data that students at small schools tend to perform better, but there are enough high performing large schools that the relationship is difficult to establish. **Consider Chicago Public Schools**. In the mid to late 1980s, Chicago schools were perilously underserving its students. Through a series of reforms, Chicago was able to stem the trend of declining performance and was able to slowly improve test scores and graduation rates. One of the methods utilized during the transformation was an approach designed to create learning communities within larger high schools. The belief was simple: students could not find their sense of self in the large institution, but if it was broken into a smaller unit, their investment would grow. Those most successful were the SWS programs that had a curricular or vocational emphasis (to borrow from the magnet school approach of previous reform efforts). Success of these programs has been predicated on the autonomy granted to the units, the strength of principal leadership, control of the school budget, and clarity of the stated vision of the particular learning community.

⁴ For information on this program, see <http://www.wccnet.org/wtmc/story/story.html>

⁵ For more information, see <http://www.geneseeid.org/mott/mmc.htm>

3. **Themed High Schools**—A variation of the magnet school, themed high schools recognize the value of small learning communities organized around a curricular focus. Many of these programs develop around curricular content areas, the most notable of which are typically science, foreign language immersion, theater and the arts, or a career oriented context. The Manpower Development Research Corporation (MDRC) recently conducted a study of the impact of **career academies**, one of the most established themed and contextualized learning models, as a way to improve the labor market chances of students at risk of failing to complete high school. Its report found that young men, whose enrollment and achievement has been slipping, increase their likelihood of graduating high school, continuing to college, finding meaningful employment, and increasing the average wage upon entering the workforce.⁶

Another variant of a themed/contextualized high school experience are effective **career pathway programs** that have emerged in Michigan and the nation. The School-to-Work, Tech-Prep, and Career Preparation programs (now largely defunded) have led, *in some places*, to effective career path development that integrates academic and vocational programs into programs attractive to *all* students, while incorporating entrepreneurial and new basic skills into a challenging academic program. Where done well (as in **Berrien County** (Berrien ISD Superintendent Paul Bergan is attending the work group meeting) and Kalamazoo County, Michigan, for example), these initiatives result in the creation of smaller learning units, and have been found to improve attendance, academic achievement, postsecondary attainment, and other key variables

Still another variant are **employer-linked, or institutionally-linked charter high schools**. Consider the Henry Ford Academy in Dearborn as a leading example. This is a charter school developed jointly by a global corporation, public education, and a world-renowned cultural institution. Conceived, developed, and implemented in cooperation with **Ford Motor Company** and **The Henry Ford**, and chartered by **Wayne County Regional Educational Service Agency**, this model partnership focuses some of the best thinking from the business, nonprofit, and public education worlds toward the common goal of building a school that will prepare students for life in the twenty-first century. Henry Ford Academy is dedicated to developing self-initiated learners and critical thinkers who function as responsible citizens in a global community. Through use of best educational practices, responsible innovation, partner and other community resources, the academy will provide a caring, nurturing, and uniquely stimulating educational environment, rich in math, science, and technology. Notably, HFA serves a population as diverse in terms of race and ethnicity as its Wayne County, Michigan, catchment area, and has had high rates of graduation and test scores

(Steve Hamp and Mike Schmidt are participating on the Commission and work group and can describe HFA in more detail.)

⁶ For the full report, visit <http://www.mdrc.org/publications/366/full.pdf>

Excerpt from the Mathematics Section of the Michigan Curricular Frameworks

Mathematics

Vision Statement

Mathematics is the science of patterns and relationships. It is the language and logic of our technological world. Mathematical power is the ability to explore, to conjecture, to reason logically and to use a variety of mathematical methods effectively to solve problems. The ultimate goal of mathematics education is for all students to develop mathematical power to participate fully as a citizen and worker in our contemporary world.

A mathematically powerful individual should be able to:

- reason mathematically;
- communicate mathematically;
- problem solve using mathematics; and,
- make connections within mathematics and between mathematics and other fields.

The fifteen content standards have been categorized into the following six strands:

- I. Patterns, Relationships, and Functions
- II. Geometry and Measurement
- III. Data Analysis and Statistics
- IV. Number Sense and Numeration
- V. Numerical and Algebraic Operations and Analytical Thinking
- VI. Probability and Discrete Mathematics

OVERVIEW OF THE MATHEMATICS CONTENT STRANDS

Strand I. Patterns, Relationships, and Functions

Patterns, relationships and functions comprise one of the most important themes in the study of mathematics. Mathematical thinking begins with the recognition of similarities among objects or events, proceeds to generalization and abstraction, and culminates in the ability to understand, explain and make predictions. Contexts that exhibit structure and regularity provide rich opportunities for describing the physical world, studying mathematics and solving problems.

Standard I.1 Patterns

Students recognize similarities and generalize patterns, use patterns to create models and make predictions, describe the nature of patterns and relationships, and construct representations of mathematical relationships.

Wherever there is mathematics there are patterns, and wherever there are patterns there is mathematics. Patterns are regularities or similarities that characterize sets of numbers, shapes, graphs, tables or other mathematical objects. Mathematicians look for patterns in everything they do; thus, mathematics is frequently defined as the science of patterns. In studying mathematics, students learn to recognize, describe, analyze and create patterns, to extend and generalize patterns, to create mathematical models based on observed patterns, and to predict the behavior of real-world phenomena based on such observed patterns. They learn to communicate the nature of mathematical patterns and relationships in various ways including words, physical models, diagrams, tables, charts, graphs, and equations. Since each representation highlights different aspects of the patterns and relationships, students must be able to construct multiple representations of mathematical relationships and to translate among them.

Standard I.2 Variability and Change

Students describe the relationships among variables, predict what will happen to one variable as another variable is changed, analyze natural variation and sources of variability, and compare patterns of change.

Variability and change are as fundamental to mathematics as they are to the physical world, and an understanding of the concept of a variable is essential to mathematical thinking. Students must be able to describe the relationships among variables, to predict what will happen to one variable as another variable is changed, and to compare different patterns of change. The study of variability and change provides a basis for making sense of the world and of mathematical ideas.

Strand II. Geometry and Measurement

We live in a three-dimensional world. In order to interpret and make sense of that world, students need both analytical and spatial abilities. Geometry and measurement, which involve notions of shape, size, position, and dimension, are used extensively to describe and understand the world around us.

Standard II.1 Shape and Shape Relationships

Students develop spatial sense, use shape as an analytic and descriptive tool, identify characteristics and define shapes, identify properties and describe relationships among shapes.

Spatial sense is developed when students recognize, draw, construct, visualize, compare, classify and transform geometric shapes in both two and three dimensions. They learn to identify those characteristics that are necessary to define a given shape, and they can differentiate one shape from another. Students also develop an awareness of the properties of a shape and of the relationships among shapes. This

References

- American Diploma Project. (2002). *Ready or not: Creating a high school diploma that counts Executive Summary*. Washington, DC: Achieve, Inc., The Education Trust, Thomas B., Fordham Foundation.
- Association of American Colleges & Universities. (2002). *Greater expectations: A new vision for learning as a nation goes to college*. Washington, DC: Association of American Colleges and Universities.
- Bureau of Labor Statistics. (2004). *Education Pays*. Retrieved August 12, 2004, from <http://stats.bls.gov/emp/edupays.pdf>.
- Department of Education. (2002). *No child left behind*. Retrieved October 28, 2002, from <http://www.nlcb.gov>.
- Florida Department of Education. (2004). *Graduation Requirements for Basic, Adult, and Special Programs*. Retrieved September 12, 2004, from <http://www.firn.edu/doe/curriculum/ccd2/gradreq.pdf>.
- Greene, J. P., & Forster, G. (2003). *Public high school graduation and college readiness rates in the United States* (Working Paper). New York: Manhattan Institute.
- Labaree, D. F. (1997). *How to succeed in school without really learning : the credentials race in American education*. New Haven, Conn. ; London: Yale University Press.
- Michigan Department of Education. (1996). *Michigan Curriculum Framework*. Retrieved September 12, 2004, from http://www.michigan.gov/documents/MichiganCurriculumFramework_8172_7.pdf.
- National Commission on Excellence in Education. (1983). *A nation at risk*. Washington, DC: Department of Education.
- National Commission on the High School Senior Year. (2000). *Youth at a crossroads: Facing high school and beyond*. Retrieved October 2, 2002, from <http://www.commissiononthesenioryear.org/Report/HSReportfinal.pdf>.
- New York State Education Department. (2002, September 12). *Diploma Requirements*, from <http://www.emsc.nysed.gov/part100/pages/1005a.html>.
- Powell, A. G., Farrar, E., Cohen, D. K., National Association of Secondary School Principals (U.S.), & National Association of Independent Schools. Commission on Educational Issues. (1985). *The shopping mall high school : winners and losers in the educational marketplace*. Boston: Houghton Mifflin.
- Presidents Council, State Universities of Michigan. (2000). *Designing Your Future*. Retrieved September 12, 2004, from <http://www.pcsum.org/pdfs/DYF2-04.pdf>.
- Texas Education Agency. (2004). *Texas State Graduation Requirements for Students*. Retrieved September 12, 2004, from <http://www.tea.state.tx.us/teks/handbook/gradreq.pdf>.