Albuquerque Public Schools
Magnet Schools Assistant Program Grant Application
Engineering the Future Project Narrative
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Part III: Program Narrative

Competitive Preference Priority 1: Need for Assistance

Albuquerque Public Schools (APS) is the largest public school system in New Mexico and the thirty-fourth largest in the nation, covering nearly 1,200 square miles and encompassing Native American pueblos, historical Spanish-speaking land grant communities and dense urban areas. With 141 schools, Albuquerque Public Schools serves a highly ethnically, culturally, linguistically, and economically diverse population of 86,104 students, as shown below. This total includes all students, such as students enrolled in early childhood education and students enrolled in post-graduation special education transition services, not just students in grades PK through 12.

Table 1: Enrollment in APS, Disaggregated by Ethnicity, 10/01/2016

	Hispanic	***Two or***	***White***	***Native***	***Asian***	***Pacific***	***Black***	***Total***
Number	57,542	2,722	17,945	3,815	1,819	108	2,152	86,104
Percentage	66.83%	3.16%	20.84%	4.43%	2.11%	0.12%	2.50%	100%

In this application to the Magnet Schools Assistance Program (MSAP), Albuquerque Public Schools proposes to create a new K-12 STEM magnet school pathway, located in a largely low-income and Hispanic area of the city known as the North Valley. This K-12 STEM magnet school pathway will attract students from different social, economic, ethnic and racial backgrounds and will reduce existing levels of minority group and socio-economic group isolation. The proposed project will fill the gaps in the district's existing STEM magnet school offerings, which includes a STEM magnet middle school but no elementary or high school

offerings. By developing continuity in the district's PK-12 STEM pathway, the district will be better positioned to achieve its goal of graduating students fully prepared for citizenship and careers.

APS's proposed project, ***Engineering the Future***, has identified three schools for inclusion in this project: one existing elementary school, which will be transformed from a traditional school to a STEM magnet school, one existing STEM magnet middle school, and one new high school to be co-located in an existing high school building. All three schools currently serve a predominantly low-income and Hispanic population and have more than sufficient physical plant capacity to admit more students, as evident in ***Table 2***.

Table 2: Hispanic & Low Income Enrollment & Capacity, Compared to District Average

School	***%***	***+/- District***	***% Low***	***+/- District***	***% of***	***+/- District***
Mission STEM Elementary	60.93%	(-5.89)	100%	+28	71.9%	-13.4
Garfield STEM Middle	84.59%	+17.77	100%	+28	45.57%	-39.7
Valley High School (Site of North Valley STEM Academy)	86.41%	+19.58	62.35%	(-8.65)	67.94%	-17.4

The proposed three magnet schools are intended to provide Albuquerque families with a greater choice of academically rigorous STEM learning options, while also promoting racial, ethnic, cultural and socio-economic diversity within Albuquerque Public Schools.

The need for this project in Albuquerque is urgent. According to a 2016 study commissioned by New Mexico's Los Alamos National Laboratories, New Mexico community colleges and universities annually graduate approximately 5,500 individuals with STEM-based degrees. By 2020, demand for individuals with these qualifications will require the state to increase graduates with these degrees by 25% in order to meet workforce needs. However, the current K-12 educational system is not coming close to filling this pipeline. In 2016, only 20.7% of all tested students in Albuquerque Public Schools were proficient in Math. Only 14.9% of Hispanic students and 12.4% of low-income students were considered proficient. The achievement gap was even more pronounced for Native American students (10.7%), Black students (11.7%), English language learners (6.5%) and students with disabilities (4.9%). These dismal results, which are significantly lower than national averages, mean that the vast majority of students graduate from Albuquerque Public Schools poorly equipped to pursue post-secondary education or careers in STEM fields. With a growing percentage of all jobs, especially well-paying jobs, requiring STEM skills, the STEM achievement gap deters a disproportionate number of low-income and non-Anglo students from economic advancement. This lack of a well-prepared STEM workforce also deters companies from locating in Albuquerque and hampers the regional economy.

Without grant funding, Albuquerque Public Schools will be unable to implement the ***Engineering the Future*** project as described in this proposal. The district currently lacks the capacity to build a true K-12 STEM pipeline capable of preparing low-income and non-Anglo students to seize the growing opportunities within STEM fields. If funded, APS will implement

the plan described in this proposal to reduce minority group and low socio-economic status isolation (MSAP Purpose 1) and to provide all students with the opportunity to meet challenging New Mexico State Standards and Benchmarks (MSAP Purpose 2). By developing and implementing an integrated approach to STEM throughout the curriculum (MSAP Purpose 3), the ***Engineering the Future*** project will better prepare students for post-secondary education and careers in STEM fields (MSAP Purpose 4). Through the integration of extensive professional development, the ***Engineering the Future*** project will strengthen the district's capacity to implement magnet schools and STEM-based education (MSAP Purpose 5). Further, ***Engineering the Future*** will support the district's vision of a system in which every student has equal access to educational opportunity and no student's racial, ethnic, cultural, socio-economic or language background, disability or other protected status is a barrier to academic success (MSAP Purpose 6).

Considering the State of New Mexico's current budget difficulty, the steady decline of Albuquerque Public Schools' enrollment and the rising needs of an increasingly impoverished student population, it is unlikely that APS will be able to implement the ***Engineering the Future*** project in the near-term without Magnet Schools Assistance Program funding. While the district has ample space and school facility capacity, operational budgets received two cuts in the 2016-2017 school year totaling $25 million, and the district is currently anticipating another 2% cut in the 2017-2018 school year. As of the MSAP application deadline, the Governor and New Mexico Legislature have not been able to agree on a fiscal year 2018 budget and the district is focused on protecting classrooms from the deepest cuts. Schools and departments have been asked to prepare preliminary non-personnel budgets cutting investments in professional development, supplies and services by 20%.

a. The costs of fully implementing the magnet schools project as proposed;

Albuquerque Public Schools anticipates supporting 2,073 students and 88 instructional staff over five years if the ***Engineering the Future*** project is funded. Magnet Schools Assistance Program funding will make possible the following components of the project: (1) district-level and school-level personnel to provide project management and professional development; (2) marketing and recruitment materials and services; (3) professional development related to the design of curriculum and instruction; (4) supplies and equipment necessary for the implementation of STEM project-based learning; and (5) a rigorous, independent program evaluation.

Table 3: Magnet School Assistance Program Funded Expenses by Category and Year

	Year 1	***Year 2***	***Year 3***	***Year 4***	***Year 5***
Personnel	$569,961	$533,036	$515,807	$461,055	$468,806
Benefits	$188,384	$174,305	$164,856	$152,824	$156,251
Travel	$84,928	$45,162	$57,490	$46,987	$59,812
Equipment	$195,767	$72,432	$73,730	$216,768	$71,519
Supplies	$565,809	$369,396	$321,565	$303,910	$313,713
Contractual	$218,590	$219,165	$190,315	$186,465	$188,190
Construction	$0	$0	$0	$0	$0
Other	$96,100	$90,775	$91,939	$89,420	$91,118

Personnel included in the grant are the MSAP Project Director, the district-level STEM Specialist and one STEM Instructional Coach at each project school. It also includes the North Valley STEM Academy Principal and Secretary at 100% of the planning year and 50% of the first year of implementation. ***Marketing and Recruitment*** supplies and services include an annual budget for a Marketing Contractor and for marketing materials such as brochures,

enrollment guides, postcards and websites. A small amount is included in the budget for each school to upgrade its signage and ensure that the school's physical space reflects its mission. Significant investments in ***Professional Development*** are anticipated throughout the project's duration. This will include training in the Project Lead the Way engineering education model, training in project-based learning with Buck Institute-trained professional developers and travel to relevant national conferences. Support for professional development also includes pay outside of contract hours for instructional staff to have two hours a month for Professional Learning Communities (PLCs) and five days before schools begins for a STEM Summer Institute. ***Supplies and Materials*** included are sufficient for the project schools to build a makerspace at each school site, integrate technology into the curriculum and implement Project Lead the Way modules. Finally, sufficient resources for an ***Independent Evaluation***, which meets rigorous standards of evidence, is included. Albuquerque Public Schools requests $7,830,627 over the five year MSAP project period for the ***Engineering the Future*** project in this application.

b. The resources available to the applicant to carry out the project if funds under the program were not provided;

Currently, Albuquerque Public Schools invests resources in magnet schools through its Office of Innovation. In fiscal year 2017, the Office of Innovation had a budget of $373,931, which includes the salary and benefits of the Executive Director, professional development, stipends and materials. This budget has decreased by nearly $125,000 from just two years ago. While the MSAP does not require a grant match, the Executive Director of Innovation expects to spend a substantial amount of time on the ***Engineering the Future*** project. Besides the budget for the Office of Innovation, magnet school budgets are based on student enrollment through the district's site-based budgeting plan. While this means that magnet schools can be self-sustaining once they have built their capacity and reached their enrollment goals, it also means that

prospective magnet schools have very little means to invest in the professional development, marketing activities and cultural change necessary to become a magnet. Currently, in order to attract more enrollment, schools need to improve, but in order to have the funds they need to improve, they have to attract higher enrollment. When schools start to lose enrollment, as is currently happening at the proposed project schools, the resulting loss of resources leads to the cutting of programs, which drives away more students. ***Engineering the Future*** attempts to reverse this process by consciously designing an academic program with the means to attract students and families with an interest in project-based STEM learning opportunities.

c. The extent to which the costs of the project exceed the applicant's resources

The proposed ***Engineering the Future*** project greatly exceeds Albuquerque Public Schools' available resources. New Mexico has one of the most equitable funding formulas in the nation. Local property taxes revenues are used to support the capital needs of the district, but all operational funds come from the state through the State Equalization Guarantee (SEG) and other state and federal grants. The SEG guarantees districts a state-determined amount of funding per student and takes into account students' poverty, language-status and other risk factors when distributing funds. While highly equitable, this model is highly dependent upon state revenues and very sensitive to economic downturns. New Mexico state revenues are closely tied to the price of oil and gas, and the price of oil has plunged from $87.05 a barrel in 2015 to $34.13 in 2016. As of this writing, the state faces a $775 million deficit for the 2017-2018 fiscal year. Because of the structure of school financing in New Mexico, this deficit will inevitably impact Albuquerque Public Schools.

For the 2018 fiscal year, Albuquerque Public Schools is planning for a $26.1 million dollar reduction in operational funding, or 2% decrease in state SEG funding. This will include four-day furloughs for all 12-month employees ($2 million), three-day furloughs for all 10-

month employees ($4.2 million), increasing class sizes ($1.8 million), reducing professional development time at the high school level ($3 million), reducing departmental budgets ($4.2 million), using reserves ($5 million), reducing schools' supply budgets ($1 million) and other reductions to athletics, activities, gifted education and technology ($4.9 million). As these reductions make clear, Albuquerque Public Schools will not have the resources available to implement the professional development and other investments necessary to carry out the ***Engineering the Future*** project beginning in the 2017-2018 school year. To succeed, this project requires significant additional staffing, quality professional development and upgrades to the technology, supplies and curriculum available to teachers. Carrying out these changes is well beyond the capacity of Albuquerque Public Schools without assistance from the U.S. Department of Education.

d. The difficulty of effectively carrying out the approved plan and the project for which assistance is sought, including consideration of how the design of the magnet schools project, e.g., the type of program proposed, the location of the magnet school within the LEA—impacts the applicant's ability to successfully carry out the approved plan.

Albuquerque Public Schools has carefully considered the design of the ***Engineering the Future*** project and the location of the magnet schools within APS in order to ensure the district has the ability to successfully carry out the approved plan.

Type of Magnet Program Proposed

Albuquerque Public Schools conducted a comprehensive survey of community interests in connection with this Magnet Schools Assistance Program application in order to determine what type of magnet schools would best meet community needs. Too often, districts make decisions about how to allocate resources without doing the kind of market research that can lead to insights about the community's values and priorities. The district's Voice of the Community

2017 Survey was as an online survey in both English and Spanish constructed by an online polling firm and circulated to a district-wide sample between in early 2017. It consisted of six questions and one open-ended question. Circulation was by APS School Messenger System for district households and direct e-mail for non-School Messenger households. The survey was circulated to 14,000 individual students in 7,900 homes/families. This represents 10% of the entire district. 871 surveys were completed, constituting an 11% response rate. Two results were notable from the survey. The first was that course offerings and acceleration and enrichment were the most important factors upon which families would make their magnet school enrollment decisions (***Figure 1***). This points to the importance of designing a strong curriculum and providing highly engaging and relevant instruction, which led to the emphasis in ***Engineering the Future*** on these aspects of project design.

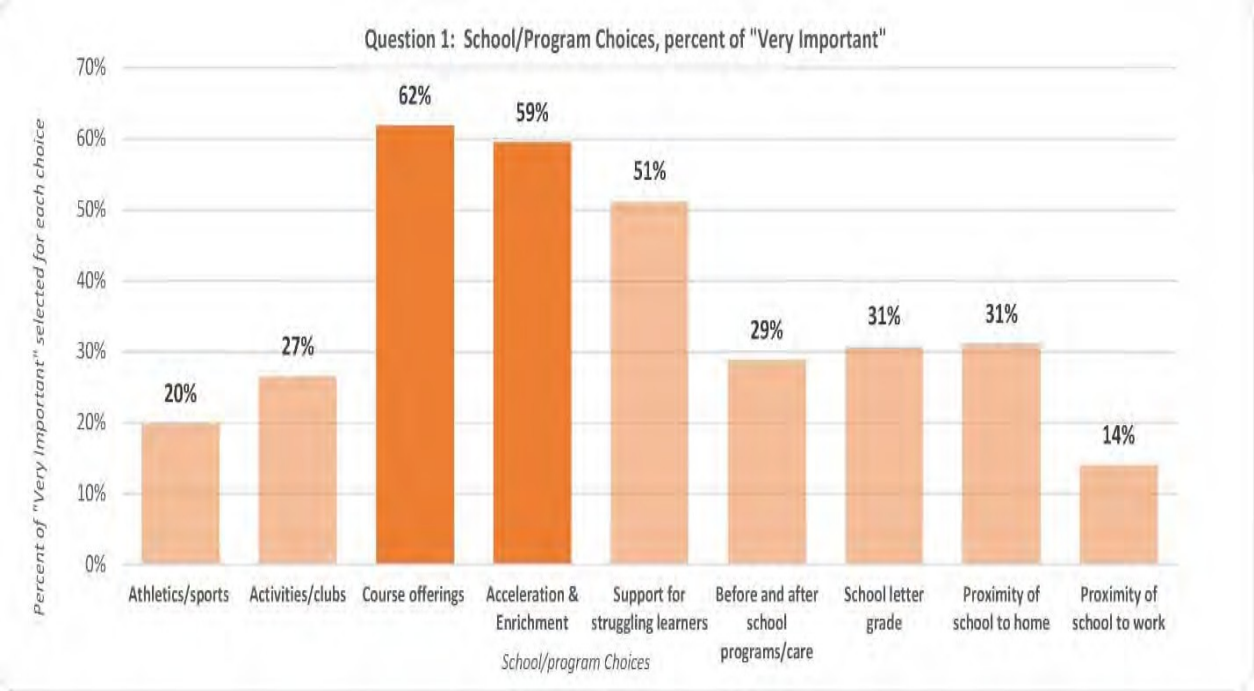

Figure 1: Voice of the Community Survey Question 1

The second was that more students and families were interested in a STEM-based curriculum and learning activities than any other single choice. For this reason, among others, Albuquerque

Public Schools decided to base its application to the Magnet Schools Assistance Program on creating a K-12 STEM pathway in one of Albuquerque's low-income and heavily Hispanic neighborhoods.

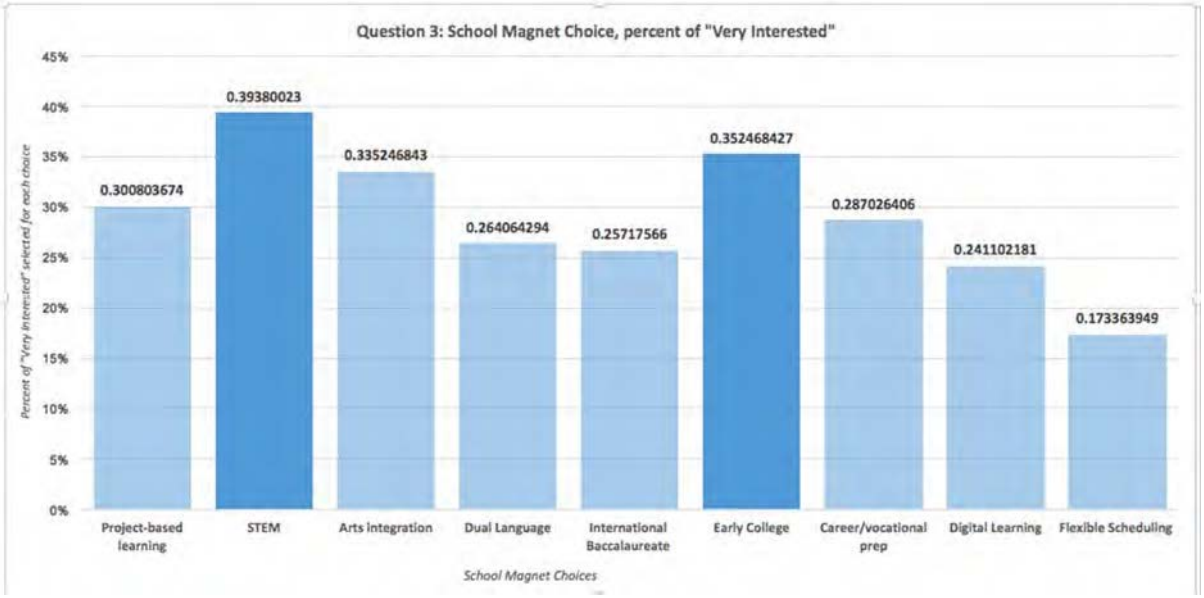

Figure 2: Voice of the Community Survey Question 3

Location of the Magnet Schools Within APS

As outlined in the Desegregation portion of the district's MSAP application, Albuquerque Public Schools proposes to locate the ***Engineering the Future*** magnet schools in the North Valley area of urban Albuquerque. In choosing the location, the district considered the magnitude of Hispanic isolation and of low socio-economic status in the selected schools, the proximity of the selected schools to major transportation corridors, the proximity of the selected schools to large employers and the existing district investments into STEM education and magnet schools. The selected magnet schools are centrally located, accessible from a major highways (I-40 and I-25) and located near a growing corridor of employers along the I-25 frontage. These characteristics make it more likely that families will consider voluntary magnet school enrollment based on the school's relative accessibility. The largest concentration of Hispanic minority group and low socio-economic status students in currently on Albuquerque's

West Side, which is to the west of the Rio Grande. By locating the magnet schools in the North Valley between the North Valley and I-25, the magnet schools are accessible to a diverse portion of the community. Indeed, nearly a dozen charter schools and private schools are currently located in this area, a reflection of its suitability for schools of choice within the greater Albuquerque area.

Albuquerque Public Schools has set reasonable and achievable goals for the reduction of Hispanic minority group isolation, the reduction of low socio-economic status isolation and the increase of enrollment into the project magnet schools. These goals have been set in the context of public school enrollment which is overwhelmingly Hispanic (66.83%) and low-income (72%). In order not to exacerbate existing equity issues within the district, the ***Engineering the Future*** project uses a reverse-integration model. That is, the proposed magnet schools are located in a low-income, majority-Hispanic neighborhood, with the theory that a rigorous curriculum, innovative project-based learning, connections to STEM learning opportunities outside the classroom, and a highly-relational school climate will draw non-Hispanic students and students who do not qualify for free or reduced lunch to voluntarily enroll in the proposed magnet schools. Funding from the Magnet Schools Assistance Program will allow Albuquerque Public Schools to provide the resources necessary to transform the proposed magnet schools and actualize the district's plan to improve student academic achievement, including STEM academic achievement within the context of fostering diversity in student populations.

Competitive Preference Priority 4: Increasing Racial Integration and Socioeconomic Diversity

The Secretary determines the extent to which the applicant proposes to increase racial integration by taking into account socioeconomic diversity in designing and implementing magnet school programs.

Research demonstrates the importance of socio-economic diversity in designing and implementing magnet school programs. For example, low-income students attending more affluent schools had higher test scores in mathematics on the 4th grade National Assessment of Educational Progress (NAEP) in 2011 than their peers attending high-poverty schools. Other research has confirmed the positive effects of attending a mixed-income school, documenting a 30% growth in test scores for low-income students in mixed-income schools over similar low-income students in schools with concentrated poverty (The Century Foundation, 2016). Similar effects of attending a mixed-income school have been documented to improve low-income students' graduation rates and college-going rates. Together, a body of evidence has emerged that attending a racial segregated and/or economically segregated school is particularly harmful to the life chances of low-income students.

At the same time as mounting evidence is demonstrating that mixed-income schools better serve low-income students, America's schools have never been more economically segregated. Between 1991 and 2012, between-school segregation of students who were eligible for free and reduced lunch versus students who were ineligible for free and reduced lunch increased by over 40% in the 100 largest school districts in the United States (Owens, Reardon & Jenks, 2016). This growing economic segregation is caused by growing income inequality and the tendency of like-income homeowners to live in the same neighborhoods. School districts, including APS, typically assign students to schools based on their home address, amplifying this effect and creating schools with concentrated wealth and concentrated poverty. Despite efforts to improve schools with concentrated poverty through Title I funding, the results in New Mexico have failed to close the achievement gap. According to a 2014 report from the New Mexico Center on Law and Poverty, the achievement gap in New Mexico on the National Assessment of

Educational Progress (NAEP) between low-income and non low-income students ranged from 21 to 28 percentage points.

Table 4: New Mexico achievement gap between low-income and non low-income students that are "at or above proficient" in reading and math (NAEP 2013)

	% of Low-Income	*% of Non Low-Income*	*Achievement Gap*
4th Grade Reading	15%	39%	-21
8th Grade Reading	16%	37%	-24
4th Grade Math	24%	51%	-28
8th Grade Math	16%	39%	-23

Through the ***Engineering the Future*** project, Albuquerque Public Schools has designed a magnet project to voluntarily increase racial integration at the three project schools by taking into account socio-economic diversity. As will be discussed in Section (a) Desegregation, Albuquerque Public Schools plans a robust recruitment effort with significant resources devoted to encouraging the enrollment of non low-income students in the project's magnet schools. The enrollment process, as described in the same section of the application, will use a modified randomized lottery approach to allocate 25% of available slots in each magnet school to each geographic cluster of the district. As these geographic clusters range in low socio-economic status from 32% to 83%, this ensures that students from more affluent schools with lower concentrations of poverty have substantially similar odds of gaining a spot in the magnet school as students from less affluent schools with higher concentrations of poverty. As the ***Engineering the Future*** magnet schools will retain their neighborhood attendance zone boundaries, which are

heavily Hispanic and low-income, the enrollment of non low socio-economic status students in the magnet schools will have the effect of reducing the concentration of poverty.

The ***Engineering the Future*** project has set specific, reasonable and attainable targets for socio-economic diversity in each project magnet school. Please see Section (e) Quality of Performance Measures for the specific targets for each school for each year of the grant funded project. Throughout the application, Albuquerque Public Schools defines low-income students as students who qualify for federally funded free or reduced lunch. In the 2016-2017 school year, the annual income limit for a family of four to qualify was $31,590 annually for free lunch or $44,955 for reduced lunch. The district's theory of action is that, due to the substantial linkage between minority group isolation and socio-economic status isolation, improving socio-economic diversity at the project magnet schools using the strategies outlined in this proposal will also improve racial and ethnic diversity.

Desegregation (30 points)

The Secretary reviews each application to determine the quality of the desegregation-related activities and determines the extent to which the applicant demonstrates—

(1) The effectiveness of its plan to recruit students from different social, economic, ethnic, and racial backgrounds into the magnet schools.(34 CFR 280.31(a)(2)(v)

In this application to the Magnet Schools Assistance Program, Albuquerque Public Schools proposes to create a K-12 STEM pathway of magnet schools in the city's North Valley. The proposed project, ***Engineering the Future***, will involve transforming an existing elementary school (Mission Elementary) into a STEM magnet school, strengthening an existing STEM magnet middle school (Garfield STEM Magnet Middle) and opening a new STEM magnet high school to be co-located on the Valley High School campus (North Valley STEM Academy). The goal of the project will be to increase student academic achievement, increase student STEM

knowledge and abilities and to reduce Hispanic and low socio-economic status isolation at the project schools.

Albuquerque Public Schools is a majority minority and majority low-income district, serving a diverse group of students including a sizable urban Native American population. By far the largest minority group is Hispanic students, which comprise approximately two-thirds of the student population. As can be seen from ***Table 5***, Albuquerque Public Schools is currently experiencing a decline in overall enrollment, from a high of 90,103 students in 2009 to 86,928 in 2015. In the 2016-2017 school year, district enrollment has fallen again to 86,104. Declining enrollment is largely due to the stagnant economy in New Mexico, which has the highest unemployment rate in the nation, and the aging of the city's population. A secondary factor is competition from charter schools, of which there are now 54 in the Albuquerque area. As ***Table 5*** also demonstrates, at the same time as district enrollment overall has been falling, Hispanic enrollment has grown as a share of the district's total enrollment. This has increased the district's percentage of Hispanic students from 58.34% in 2003 to 66.92% in 2015, a growth of nearly 10 percentage points in 12 years. In the 2016-2017 school year, the percentage of Hispanic enrollment was 66.83%.

Table 5: Hispanic Enrollment and Total Enrollment on October 1 in APS, 2003 – 2015

	2015	***2013***	***2011***	***2009***	***2007***	***2005***	***2003***
Hispanic Enrollment	58,179	59,696	59,657	59,131	57,280	55,260	48,158
Total Enrollment	86,928	88,744	89,691	90,103	89,322	89,405	82,546
Percentage Hispanic Enrollment	66.92%	67.26%	66.51%	65.62%	64.12%	61.80%	58.34%

Hispanic Minority Group Isolation

As is typically the case in large, urban public school districts, Hispanic and low-income students in Albuquerque Public Schools tend not to be distributed evenly across the district's 88 elementary schools, 2 K-8 schools, 27 middle schools, 13 high schools and 11 other schools. Hispanic concentrations range from a low of 24.58% at Desert Willow Family School to a high of 96.60% at Adobe Acres Elementary School. As evidenced by ***Table 6***, Albuquerque Public Schools has identified 45 schools at which Hispanic enrollment exceeds the district average of 66.83% by more than 15 percentage points. This is approximately a third of the district's schools and includes Garfield STEM Magnet Middle School (84.59%) and Valley High School (86.41%), where the North Valley STEM Academy will be housed. The data shows that over half of the Hispanic students enrolled in Albuquerque Public Schools attend schools in which over 83% of the student body is Hispanic.

Table 6: APS Schools with Identified Hispanic Isolation 10/1/2016

School	***Hispanic***	***Total***	***Hispanic***
Alameda Elementary School	239	286	83.57%
Jimmy Carter Middle School	983	1,176	83.59%
Los Ranchos Elementary School	263	311	84.57%
Garfield STEM Magnet Middle School	313	370	84.59%
West Mesa High School	1370	1,619	84.62%
Eugene Field Elementary School	221	260	85.00%
Rudolfo Anaya Elementary School	585	684	85.53%
La Mesa Elementary School	516	603	85.57%

Wherry Elementary School	368	427	86.18%
Valley High School	979	1,133	86.41%
John Adams Middle School	511	591	86.46%
Cochiti Elementary School	292	337	86.65%
Coronado Elementary School	261	301	86.71%
La Luz Elementary School	166	190	87.37%
Career Enrichment Center	14	16	87.50%
George I. Sanchez Community School	1215	1,388	87.54%
Longfellow Elementary School	274	313	87.54%
Reginald Chavez Elementary School	262	296	88.51%
Carlos Rey Elementary School	604	678	89.09%
Mountain View Elementary School	275	307	89.58%
School On Wheels High School	88	98	89.80%
Alamosa Elementary School	495	551	89.84%
Duranes Elementary School	209	232	90.09%
Mary Ann Binford Elementary School	718	796	90.20%
Edward Gonzales Elementary School	571	633	90.21%
Pajarito Elementary School	424	470	90.21%
Helen Cordero Elementary School	573	633	90.52%
Atrisco Heritage Academy High School	2300	2,536	90.69%
Lavaland Elementary School	580	638	90.91%
Harrison Middle School	459	503	91.25%
Washington Middle School	405	442	91.63%

Polk Middle School	317	345	91.88%
Truman Middle School	1016	1,105	91.95%
Dolores Gonzales Elementary School	379	411	92.21%
Valle Vista Elementary School	505	544	92.83%
Navajo Elementary School	535	571	93.70%
Rio Grande High School	1506	1,601	94.07%
Ernie Pyle Middle School	525	556	94.42%
Kit Carson Elementary School	459	486	94.44%
Armijo Elementary School	398	421	94.54%
Barcelona Elementary School	374	393	95.17%
Los Padillas Elementary School	210	219	95.89%
East San Jose Elementary School	527	549	95.99%
Atrisco Elementary School	326	338	96.45%
Adobe Acres Elementary School	596	617	96.60%
TOTAL	24,251	27,028	

Low Socio-Economic Status Isolation

In New Mexico, Hispanic ethnicity encompasses both the descendants of Spanish colonists who have been in New Mexico for over 400 years and recently arrived English Language Learners. For this reason, Albuquerque Public Schools also examined socio-economic status when developing this Magnet Schools Assistance Program application. In the 2016-2017 school year, 72% of district students qualified for federally funded free or reduced lunch based on family income. In 2016-2017, there were 71 schools in the district at which 100% of students qualified for free or reduced lunch based on the community eligibility provision. About half of

the district's students, or 34,120 students, attended these socio-economically isolated schools. As you can see from ***Table 7***, Mission Elementary School and Garfield STEM Middle School, both project sites, fall into the socio-economically isolated category.

Table 7: APS Schools with Identified Low-SES Isolation 10/1/2016

School	***Low SES***	***Total***	***Low SES***
Adobe Acres Elementary School	617	617	100.00%
Alameda Elementary School	286	286	100.00%
Alamosa Elementary School	551	551	100.00%
Apache Elementary School	357	357	100.00%
Armijo Elementary School	421	421	100.00%
Atrisco Elementary School	338	338	100.00%
Barcelona Elementary School	393	393	100.00%
Bel-Air Elementary School	322	322	100.00%
Bellehaven Elementary School	346	346	100.00%
Carlos Rey Elementary School	678	678	100.00%
Chaparral Elementary School	850	850	100.00%
Chelwood Elementary School	548	548	100.00%
Cochiti Elementary School	337	337	100.00%
College and Career High School	142	142	100.00%
Dolores Gonzales Elementary School	411	411	100.00%
Duranes Elementary School	232	232	100.00%
East San Jose Elementary School	549	549	100.00%

Edmund G. Ross Elementary School	481	481	100.00%
Edward Gonzales Elementary School	633	633	100.00%
Emerson Elementary School	519	519	100.00%
Eugene Field Elementary School	260	260	100.00%
Garfield STEM Magnet Middle School	370	370	100.00%
Governor Bent Elementary School	459	459	100.00%
Harrison Middle School	503	503	100.00%
Hawthorne Elementary School	528	528	100.00%
Hayes Middle School	412	412	100.00%
Helen Cordero Elementary School	633	633	100.00%
Highland Autism Center Annex	22	22	100.00%
Highland High School	1321	1321	100.00%
Hodgin Elementary School	567	567	100.00%
Janet Kahn School for Integrated Fine Arts	479	479	100.00%
Jimmy Carter Middle School	1176	1176	100.00%
John Adams Middle School	591	591	100.00%
Kennedy Middle School	471	471	100.00%
Kirtland Elementary School	286	286	100.00%
Kit Carson Elementary School	486	486	100.00%
La Luz Elementary School	190	190	100.00%
La Mesa Elementary School	603	603	100.00%
Lavaland Elementary School	638	638	100.00%
Longfellow Elementary School	313	313	100.00%

Los Padillas Elementary School	219	219	100.00%
Los Ranchos Elementary School	311	311	100.00%
Lowell Elementary School	279	279	100.00%
MacArthur Elementary School	272	272	100.00%
Mark Twain Elementary School	369	369	100.00%
Mary Ann Binford Elementary School	796	796	100.00%
Matheson Park Elementary School	272	272	100.00%
McCollum Elementary School	410	410	100.00%
McKinley Middle School	431	431	100.00%
Mission Elementary School	365	365	100.00%
Montezuma Elementary School	406	406	100.00%
Mountain View Elementary School	307	307	100.00%
Navajo Elementary School	571	571	100.00%
New Futures High School	157	157	100.00%
Painted Sky Elementary School	1085	1085	100.00%
Pajarito Elementary School	470	470	100.00%
Polk Middle School	345	345	100.00%
Reginald Chavez Elementary School	296	296	100.00%
Rio Grande High School	1601	1601	100.00%
Rudolfo Anaya Elementary School	684	684	100.00%
School On Wheels High School	98	98	100.00%
Susie Rayos Marmon Elementary School	760	760	100.00%
Tomasita Elementary School	356	356	100.00%

Truman Middle School	1105	1105	100.00%
Valle Vista Elementary School	544	544	100.00%
Van Buren Middle School	572	572	100.00%
Vision Quest Alternative Middle School	3	3	100.00%
Washington Middle School	442	442	100.00%
Wherry Elementary School	427	427	100.00%
Whittier Elementary School	369	369	100.00%
Wilson Middle School	479	479	100.00%
TOTALS	34,120	34,120	

Magnet Schools as an Equity Strategy

Historically, Albuquerque Public Schools has struggled to grapple with both minority group and low socio-economic status (SES) group isolation. In 1987, the district signed a mediated agreement called the Zambrano Agreement to address long-standing issues of physical plant neglect and poor educational results at schools in the South Valley, which overwhelmingly had high Hispanic and low-SES status enrollment. While not a desegregation agreement, the agreement brought millions of dollars of improvements in South Valley school campuses and a greater focus on equity within the district, which persists today.

The use of magnet schools as a conscious strategy for school improvement and the reduction of minority group isolation is somewhat new to Albuquerque Public Schools. The Office of Innovation, the hub of this work, was created in 2014. At the time of its creation, the district had a handful of magnet schools, often created at the behest of a school or district leader with a strong vision for a school. Sometimes these schools were considered ***no-boundary magnets***, meaning they did not have an attendance zone and students had to apply to attend.

More often, they were transformations of existing schools that retained their attendance boundaries, termed ***neighborhood magnets***. In both cases, these magnets were not necessarily part of articulated K-12 magnet theme pathways, meaning that students often found themselves without clear next steps and schools often found themselves without clear feeder schools (***Table 8***). Within the district, there was a lack of support systems for magnet schools, stemming from a lack of district policies, procedures, and processes for magnet schools and even a clear definition of what a magnet school is and does. The ***Engineering the Future*** project is well-placed to benefit from the work invested since 2014 in correcting this scattershot approach and creating a strong infrastructure to support the implementation of magnet schools.

Table 8: Current Magnet Schools within Albuquerque Public Schools

Name	***Grades***	***Type***	***Magnet Theme***
College & Career High School	9-12	No-Boundary	Early College
Coronado Elementary School	PK-5	No-Boundary	Dual Language
Desert Willow Family School	K-8	No-Boundary	Homeschooling
Early College Academy	9-12	No-Boundary	Early College
eCademy	9-12	No-Boundary	Blended Learning
Freedom High School	9-12	No-Boundary	Credit Recovery
Garfield STEM Magnet Middle School	6-8	Neighborhood	STEM
Hayes STEM Middle School	6-8	Neighborhood	STEM, Dual Language
Inez Elementary School	PK-5	Neighborhood	Science & Tech
International Baccalaureate Academy @ Sandia	9-12	No-Boundary	IB Diploma Programme

Janet Kahn School for Integrated Fine Arts	PK-5	Neighborhood	Fine Arts Integration
Nex+Gen Academy	9-12	No-Boundary	New Tech Network
New Futures High School	9-12	No-Boundary	Pregnant & Parenting Teens
San Antonito Elementary School	PK-5	Neighborhood	STEM
School on Wheels	9-12	No-Boundary	Work-Study
Zuni Elementary School	PK-5	Neighborhood	Technology & Communication

If funded by the Magnet Schools Assistance Program, the ***Engineering the Future*** project will add two new magnets to this list. Mission STEM Elementary Magnet (PK-5) will be a neighborhood magnet with substantial room to grow through transfers into the school from outside its attendance zone. The North Valley STEM Academy (9-12) will be a no-boundary magnet drawing students from Garfield STEM Middle School and from other schools outside of the immediate neighborhood.

School Choice in Albuquerque

Magnet schools within Albuquerque Public Schools exist within a robust framework of school choice. Besides the 54 charter schools previously mentioned in this application, the district receives and approves a large number of intra-district transfer requests from students and families. A transfer request allows a student to attend a school outside of his or her attendance zone based on home address. As of the 40th day of the 2015-2016 school year, Albuquerque Public Schools had 8,606 elementary school students, 3,115 middle school students and 3,913 high school students attending a school other than his or her assigned school based on an approved transfer. This is 18.46% of the total student body --a significant percentage -- indicating that there is a hunger for options on the part of Albuquerque families and a willingness

to provide transportation when the choice is compelling and meets their students' needs. When combined with students attending charter schools and private schools, more than 25% of Albuquerque families are already exercising school choice.

Location of Engineering the Future Project

In the ***Engineering the Future*** project, Albuquerque Public Schools seeks to establish a K-12 STEM magnet school pathway in the North Valley area of Albuquerque. The North Valley is the area roughly defined between I-25 and the Rio Grande (***Figure 3***). Historically, the North Valley was an agricultural area, farmed by Pueblo peoples when the Spanish colonial government established Albuquerque in 1706. Beginning in the 1750s, Spanish colonists founded family settlements, including Los Duranes, Los Candelarias and Los Griegos. The building of the railroad and the establishment of a sawmill provided employment for many North Valley residents. Others were drawn to the area by two private schools built by the Presbyterian Church: the Indian Pueblo Training School and the Menaul School. The North Valley remained largely agricultural through World War I, but, like the rest of Albuquerque, rapidly transformed following World War II. The establishment of Kirtland Air Force Base and Sandia National Laboratories and the construction of the interstate highway system brought development to Albuquerque. In the North Valley, farms and vacant land were subdivided and hundreds of homes were built. Half of the current housing stock was built by 1960, and today few open areas remain. Schools followed the new residential development, including Garfield Junior High School in 1951 and Valley High School in 1953.

By the 1980s, the North Valley had started to decline. Economic, demographic and transportation changes led to investment in other parts of the city. Changes to the interstate diverted more traffic from the area, and anchor businesses closed. In 2015, 26.67% of families with children living in zip code 87107 were living below the poverty line and 55.31% of the

residents were Hispanic (2015 American Community and Survey, U.S. Census Bureau). Schools in the North Valley do not reflect the diversity and the demographics of their community. Instead, the schools in the North Valley show a concentration of Hispanic students and low-income students due to families choosing private or charter school options or transferring into other district schools. Albuquerque Public Schools chose the North Valley for the ***Engineering the Future*** project in order to address the need for reinvestment in this neighborhood, hoping to combat declining enrollment and growing concentrations of minority group isolation and poverty.

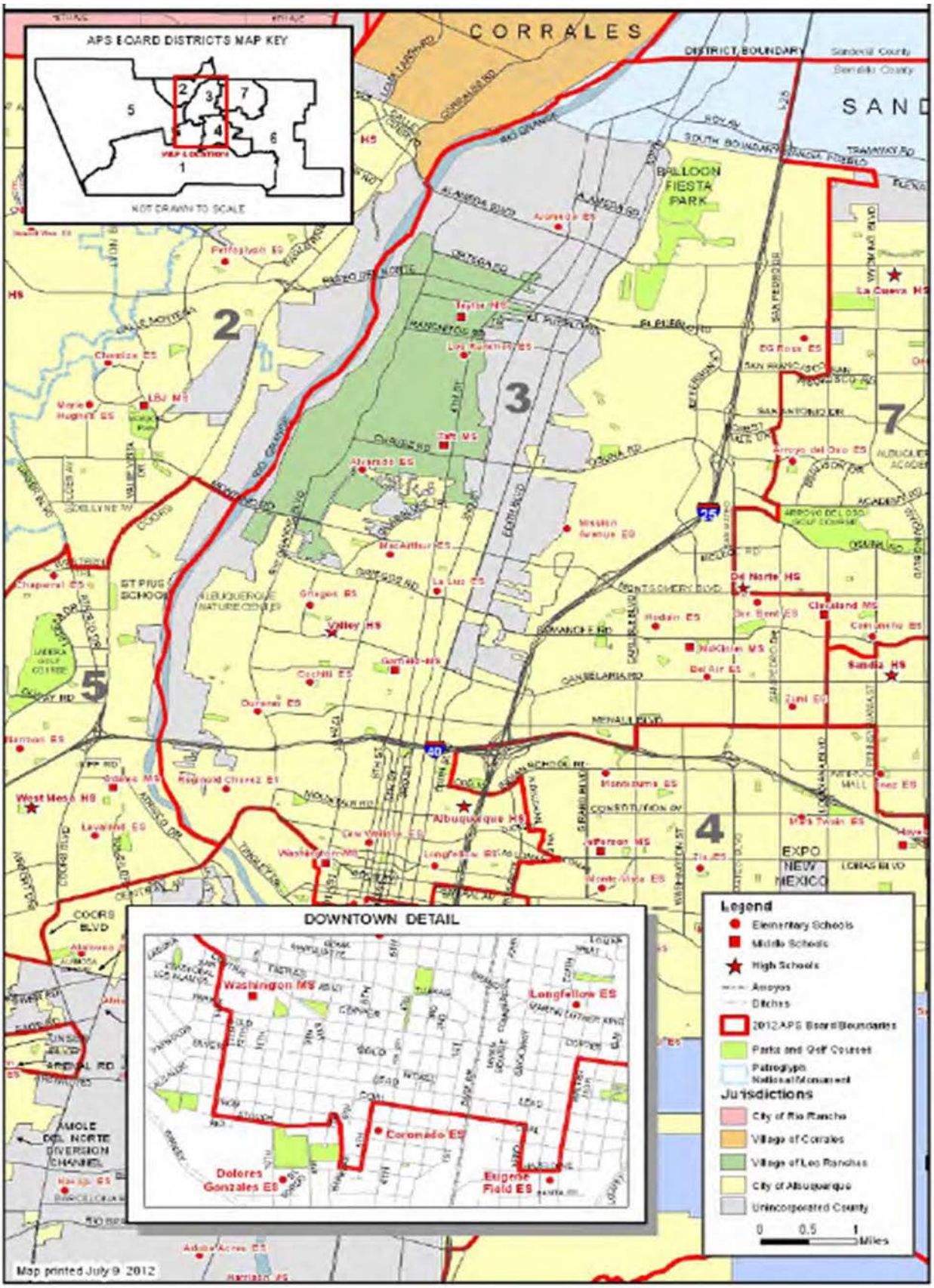

Figure 3: Map of Albuquerque Public Schools Board District 3, North Valley

Table 8: North Valley Feeder Elementary Schools to Garfield STEM Magnet Middle School						
Name of School	***Percent***	***Percent***	***Percent***	***Total***	***15-16***	***Total***
Cochiti Elementary School	88%	85.9%	100%	328	+12	380
Duranes Elementary School	100%	91.2%	100%	228	-32	410
Griegos Elementary School	100%	82.8%	64.8%	356	+87	403
La Luz Elementary School	85%	87.4%	100%	207	-100	335
Macarthur Elementary School	35%	78.1%	100%	261	+73	300
Proposed Mission STEM Magnet Elementary School	0%	63.6%	100%	366	-128	460

Table 8 demonstrates that North Valley elementary schools, as a group, are under-enrolled. Enrollment ranges from a low of 55% of capacity at Cochiti Elementary School to 88% at Griegos Elementary School. In the 2015-2016 school year, these schools had a net loss of 88 students to other schools in other parts of the district. The interaction between a shrinking overall

enrollment and a growing number of families exercising school choice has led to high levels of Hispanic and low socio-economic status isolation at the proposed magnet schools.

Proposed Mission STEM Magnet Elementary School

If funded by the Magnet School Assistance Program, Mission Elementary School will become a STEM magnet school in order to plant a feeder school for the existing Garfield STEM Magnet Middle School. Mission Elementary is only a 10-minute drive away from Garfield and has a current enrollment of 366 students. With a building capacity of 509 students, Mission has plenty of space to draw back in most of the 127 students who are currently transferring away from the school and to draw in new students from outside the North Valley. Current Hispanic enrollment is 60.93% and current low socio-economic status enrollment is 100%. In the spring of 2016, 21.19% of the 3-5 grade students at Mission Elementary were proficient or above in Reading, while 26.92% were proficient or above in Mathematics on New Mexico's mandatory standardized test, the PARCC. This compares to the district average of 24.3% proficiency in Reading and 23.3% proficiency in Mathematics. Forty-five percent of fourth graders scored proficient or above on the New Mexico Standards Based Assessment in Science, the same as the district average. English Language Learners comprise 15.7% of the school population, while students with disabilities are 15.1% of the school population. Over the five years of the ***Engineering the Future*** project, Mission Elementary's enrollment growth goal will be 30, its minority group isolation reduction goal will be 4.36% and its low socioeconomic status isolation reduction goal will be 10%. Mission's proximity to large employers, to I-25, and to two bridges over the Rio Grande that serve as major traffic arteries make it a geographically accessible option for students from all areas of the city, including the over-crowded West side.

Garfield STEM Magnet Middle School

Built in 1951, Garfield Middle School was one of the first schools built in the North Valley. In 2015, Garfield became a neighborhood STEM magnet school. By the end of the 2016-2017 school year, Garfield's STEM magnet program will have been in existence for two years. With a building capacity of 812 students, Garfield has plenty of space to accommodate the 33 students who are currently transferring away from the school and to draw in new students from outside the North Valley. Current Hispanic enrollment is 84.59% and current low-income enrollment is 100%. Garfield faces significant academic issues. In the spring of 2016, 12% of the 6-8 grade students at Garfield were proficient or above in Reading, while 8.3% were proficient or above in Mathematics on New Mexico's mandatory standardized test, the PARCC. This compares to the district average of 24.3% proficiency in Reading and 23.3% proficiency in Mathematics. English Language Learners comprise 14.9% of the school population, while students with disabilities are 25.4% of the school population. Over the five years of the ***Engineering the Future*** project, Garfield STEM Magnet Middle School's enrollment growth goal will be 90, its minority group isolation reduction goal will be 6.59% and its low socioeconomic status isolation reduction goal will be 10%.

Proposed North Valley STEM Magnet Academy

Built in 1953, Valley High School was one of the original schools built in the North Valley. Today, Valley's enrollment is 1,133 and its building capacity is 1700. For the ***Engineering the Future*** project, the Valley High School site will host a school-within-a-school model to create the North Valley STEM Academy, with a proposed capacity of 410 students. The North Valley STEM Academy will be a separate and distinct school with its own leadership, but will be housed in the Valley High School facility. Because it will be a new school, the proposed high school does not have existing demographics or academic results. Over the five years of the ***Engineering the Future*** project, the North Valley STEM Academy's enrollment

growth goal will be 410, its minority group isolation reduction goal will be 4.55% and its low socioeconomic status isolation reduction goal will be 10%.

Soliciting Parental Input

The development of the K-12 STEM pathway envisioned by ***Engineering the Future*** will offer an opportunity not only to create two new magnet schools and strengthen one existing magnet school, but also to build proof of concept for the idea of building educational pathways around expressed student interests and community needs. Albuquerque Public Schools commissioned a district-wide sampling survey of parents to conduct research into the market for magnet schools like the ones proposed in this application. The Voice of the Community 2017 Survey was an online survey administered in both English and Spanish in early 2017 to households with an APS student via direct email or the district's School Messenger communication system. The survey was circulated to 7,900 households. 871 surveys were completed, constituting an 11% response rate. The targeted households mirrored typical district characteristics in family economic profile, race and ethnicity, geographic location, and student grade level. Question 3 asked survey respondents to indicate how interested your student would be in specific magnet school choices (***Table 9***). Respondents ranked their choices from 1 (Not Interested) to 7 (Very Interested).

Table 9: Responses to Magnet School Interests in Voice of the Community Survey

To what degree is your	***0***	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***Total***	***% Very***
Real World Project-based learning that uses	21	60	28	40	88	171	201	262	871	30%

technology to grow 21st century skills										
Science, Technology, Engineering and Math (STEM) integration	22	39	14	29	77	143	204	343	871	***39%***
Arts integration (Music, Visual Arts, Digital Media, Theater, Dance)	20	59	30	50	102	137	181	292	871	34%
Dual Language (Spanish and English)	26	142	67	77	115	117	97	230	871	26%
International Baccalaureate	35	76	42	57	117	166	154	224	871	26%
Early College	37	32	17	38	84	155	201	307	871	35%
Career/vocational prep, job shadowing, internships	38	40	35	48	110	157	193	250	871	29%
Digital Learning	21	62	40	55	122	162	199	210	871	24%
Flexible Scheduling (part day or week learning at home, part day or week at school)	35	154	79	92	132	130	98	151	871	17%

As these results show, integrated STEM learning (39%) was the top choice of survey respondents when considering magnet school choices. By building magnet schools around the

expressed interests of the community, APS seeks to use magnet schools as a means of reducing the concentrations of poverty within schools and to build diverse student bodies that successfully reduce minority group isolation.

As the Voice of the Community Survey demonstrates, the time is ripe to create STEM magnet schools in Albuquerque, based on family demand for this option and a widespread acknowledgement that STEM skills will be crucial to building the future workforce of New Mexico. While the Project Design portion of this application will describe how the magnet schools' strong educational programs will improve students' academic achievement, this portion of the application will describe how a vigorous and multi-pronged recruitment effort will increase enrollment in the ***Engineering the Future*** project magnet schools and will reduce minority group and low socio-economic status isolation. These efforts will work in tandem to create vibrant magnet schools with rigorous curricula, innovative instruction, supportive environments and diverse student bodies.

APS Magnet School Enrollment Process

As described earlier in this application, Albuquerque has a robust school choice process, which operates out of the district's Student Service Center. The ***Engineering the Future*** project will collaborate with the Student Service Center to adapt the existing school transfer request process to the specific magnet schools included in this proposal. The ***Engineering the Future*** Magnet School Enrollment Process will use an intra-district modified lottery approach in order to fill seats in the magnet schools available to students outside of the school's attendance zones. As described in this section, both Mission STEM Magnet Elementary School and Garfield STEM Magnet Middle School have existing attendance boundaries, but both schools are currently under capacity. Mission STEM Elementary has the capacity for 143 additional students and Garfield STEM Middle has the capacity for 442 additional students. In the case of Garfield, even if all of

the students in its attendance zone attended the school, it would still be far under capacity. As a new school, North Valley STEM Academy will be located at Valley High School and will not have an attendance zone, but will use Valley High's School attendance zone for lottery enrollment purposes. The purpose of the ***Engineering the Future*** project is to draw students from other attendance zones in order to create racially, ethnically, culturally and socio-economically integrated schools.

In establishing enrollment procedures for the ***Engineering the Future*** magnet schools, Albuquerque Public Schools will use the following priority system to ensure compliance with federal and state regulations as well as to establish a K-12 STEM pipeline for a diverse student population.

1. Students residing within the attendance zone established by the Board of Education for each school shall be admitted.
    a. Mission STEM Elementary will use existing boundaries.
    b. Garfield STEM Middle will use existing boundaries.
    c. North Valley STEM Academy will use Valley High School boundaries.
2. Subject to space and completing a transfer request form by the deadline, siblings of currently enrolled students shall be admitted.
3. Subject to space and completing a transfer request form by the deadline, students who are currently attending Mission STEM Elementary shall be admitted into Garfield STEM Middle and students currently attending Garfield STEM Middle shall be admitted into the North Valley STEM Academy.
4. Subject to space and completing a transfer request form by the deadline, students who previously attended a project magnet school and who would like to re-enroll.

5. Subject to space and completing a transfer request form by the deadline, any other student residing within Albuquerque Public Schools boundaries.
6. Enrollment will never be based on a student's academic or athletic performance or on a student's disciplinary or attendance record.

The application period for submitting transfer request forms will open on January 1 of each year and will close on January 31. Should more applications for the one of the ***Engineering the Future*** project magnet schools exceed available spots during the first open transfer window, an intra-district modified lottery will be held. Should applications not fill existing spots, a second transfer window will be opened. Currently, Albuquerque Public Schools has grouped district schools in four clusters, which are aligned with the district's 13 large comprehensive high schools and their feeder patters. These clusters are:

1. East Side, North: 32.0% free and reduced lunch; 45.2% Hispanic
2. East Side, South: 72.5% free and reduced lunch; 68.9% Hispanic
3. West Side, North: 40.3% free and reduced lunch; 66.4% Hispanic
4. West Side, South: 84.3% free and reduced lunch; 89.9% Hispanic

When holding the intra-district modified lottery, students who have completed a transfer request form by the deadline will be assigned into one of the four clusters based on where their home address indicates they would attend, regardless of their actual current school. The Student Service Center will use a random number generator to assign a number to each applicant in each cluster, and each cluster will receive an equal number of available slots. Should a cluster fail to garner its full allocation of applications, those slots will be evenly redistributed to the other clusters. Once rank-order lists are generated by the Student Service Center, lists will be distributed to each magnet school and magnet school staff will contact the families to make an offer of enrollment. Should the family decline enrollment in the magnet school, the slot will go

to the first family on the waiting list from that cluster. By using clusters to organize the lottery for magnet school slots, Albuquerque Public Schools will ensure racial, ethnic and socio-economic diversity. By ensuring that students currently attending a STEM magnet school receive enrollment preference, the district will be able to build a STEM K-12 pipeline of interested students and committed families.

Recruitment Plan

The MSAP Project Director, overseen by the Executive Director of Innovation, will coordinate recruitment activities for the ***Engineering the Future*** project. Recruitment will require coordination between a variety of stakeholders, including the Marketing Contractor hired to create materials for the project, district leadership, the APS Marketing and Communication Department, the APS Web Team, the Director of the Student Services Center, responsible for enrollment, the Magnet School Principals, members of the Magnet School STEM Steering Committee and the instructional staff at magnet schools. The MSAP Project Director will coordinate the creation of a recruitment plan focusing on diverse students for each magnet school in partnership with the school's Instructional Council. The Instructional Council will develop a school-specific recruitment plan for each year of the project. The school recruitment plans to include activities and strategies, personnel responsibilities, deadlines, resources needed, and the targeted communication group or subgroup. The MSAP Project Director will coordinate the school-specific recruitment plans with district efforts and plan with the project goal in mind to ensure the required materials are prepared and any needed advertising is coordinated. Recruitment plans will be living documents, reviewed on a monthly basis, and modified as necessary to address actual recruitment and enrollment results.

Engineering the Future Recruitment Strategies

Working closely with the each school's staff, the MSAP Project Director and the Marketing Contractor will assist each school in creating a mission and vision, developing branding to reflect that mission and designing a variety of recruitment materials, including posters, postcards, fliers, social media posts, videos, billboards and advertisements. The APS Web Team will work with each school on redesigning its website to reflect a new vision and new school-wide practices, with an emphasis on inviting families to enroll. The district's translation service department will ensure that all materials are available in a variety of languages, while the Web Team will ensure that all online materials are fully accessible. Working closely with the Student Services Center, the MSAP Project Director will create an enrollment guide and will ensure that the enrollment process is accessible to all parents and barrier free. The MSAP Project Director will also work with the Marketing Contractor to place magnet school advertisements in a variety of outlets, to send a targeted mailing to district households and to work with local media to publicize the project.

Recruitment Training

The ***Engineering the Future*** project recognizes that recruitment efforts are not just accomplished through mass communication. Much of what drives enrollment in a school is word-of-mouth recommendation and face-to-face interaction. For that reason, the MSAP Project Director and the Executive Director of Innovation will conduct recruitment strategy trainings for school staff and for parents of students currently attending the magnet school. The goal of the recruitment strategy trainings will be to build enthusiasm among school stakeholders and equip them to talk about their magnet school experiences in a clear and compelling way to other parents, teachers and community members. Training and coaching of Instructional Council members will allow them to train others in the school and to build the culture of positive promotion. Training will prepare parents and school employees to respond to common questions

and to have concise information about how to apply at hand. The goal will be to help parents and school employees feel comfortable asking prospective students and parents if they are interested in attending and to obtain contact information for follow-up activities.

School Choice Fair

Albuquerque Public Schools holds an annual school choice fair for all APS comprehensive, magnet, and charter schools. This can be a powerful opportunity to reach out to prospective parents and students because the attendees are already ready to choose a school based on its fit with their interests. The MSAP Project Director and Marketing Contractor will assist each magnet school in creating a three-dimensional, engaging display, along with take away materials for interested families. Trained teachers, school leaders, parents and students will attend to serve as ambassadors for the school and to their personal stories of their experience at the school. Technology should be integrated into the display in order to demonstrate the schools' emphasis on technology. The goal of the School Choice Fair is to persuade as many families as possible to visit the school for an open house or tour during the transfer application timeframe. Families will also be asked to complete an interest form so that the school can reach out to them to invite them to a later event within a week of the Fair.

Open Houses, School Tours & Orientations

Open houses and school tours are key elements of a school recruitment strategy. One only needs look at how exclusive private schools recruit students to understand that nothing is more powerful than visiting a school and sizing up its culture and community. In the first year of the project, the MSAP Project Director and the Marketing Contractor will devote a significant amount of time to helping magnet schools prepare for these events. Most principals and teachers have never had to plan or implement recruitment events like these, so extensive planning will address who should speak, what should be addressed, what parts of the school should be visited

and what key themes and ideas should be emphasized. Events can be customized for different audiences and can include student performances, parent testimonials, videos highlighting the school's mission and question and answer sessions. A well-run and compelling open house or tour will prompt parents to spread the word about their experience, while one that fails to inspire will fail to increase enrollment. The magnet schools will plan and hold parent and student orientations to stress the special nature of the school, to provide information and to answer questions after the enrollment period is over and families have selected the magnet school. This is all part of the effort to create an environment which reinforces the school's culture and climate.

Communicating with Prospective Parents

When prospective parents attend an Open House, the school will ask their permission to add them to a mailing list. This will allow the school to communicate periodically about enrollment deadlines, school accomplishments and other news. The Marketing Contractor will assist each school in developing an attractive, mobile-friendly email newsletter to share information both with current and prospective parents. Collecting parent contact information, will allow the magnet schools to remind parents about deadlines and encourage them to think of themselves as part of the school community. After the enrollment period closes, the Independent Evaluator will also use parent contact information to conduct a survey of both parents who decided to apply and attend the school and parents who decided not to apply. The ***Engineering the Future*** project recruitment team will use this feedback from parents to fine-tune their presentations, address parent insights and concerns and better shape recruitment and project implementation strategies to meet the needs of families. For example, if a prospective parent did not apply to a magnet school because it lacked morning or afternoon childcare options, there is an opportunity to shape the school's offerings to better meet community needs. Gathering parent

feedback throughout the project period will be crucial to understanding the needs of the community, which will make the project stronger and more sustainable over time. It also sets an expectation that parent voices will be welcomed and solicited at the ***Engineering the Future*** project magnet schools.

(2) How it will foster interaction among students of different social, economic, ethnic, and racial backgrounds in classroom activities, extracurricular activities, or other activities in the magnet schools (or, if appropriate, in the schools in which the magnet school programs operate). (34 CFR 280.31)

Albuquerque Public Schools understands that reducing minority group isolation at the school level is simply the first step in addressing inequities. The district must also take responsibility for ensuring that the school environment is such that all students are valued for their unique selves – not just their race, ethnicity or socio-economic background – but also for their languages, abilities, interests, cultural backgrounds and learning strengths. In order to foster interaction among students of different social, economic, ethnic, and racial backgrounds in classroom activities, extracurricular activities, or other activities in the magnet schools, the ***Engineering the Future*** project will attend to using culturally responsive teaching strategies, socio-economically responsive teaching strategies, heterogeneous grouping, collaborative project- based learning, and a constructivist approach to shape classrooms and schools in which everyone – students, teachers and parents – value learning in a diverse environment. In addition, APS will carefully examine all school practices to determine if systemic barriers or school policies are unintentionally creating situations which work against the goal of diversity.

Culturally Responsive Teaching

According to research (Wlodkowski & Ginsberg, 1995), four conditions are necessary for culturally responsive teaching: (1) establishing inclusion, (2) developing a positive attitude, (3)

enhancing meaning and (4) engendering competence. It comes from a strengths-based perspective and assumes that everyone in the classroom has an important contribution to make to the learning environment. Culturally responsive teachers modify their instructional practices to make the curriculum accessible to all students through different entry points. Culturally responsive teachers do the following:

- ☐ Emphasize the human purpose of what is being learned and its relationship to the students' experience.
- ☐ Share the ownership of knowing with all students.
- ☐ Collaborate and cooperate. Assume a hopeful view of people and their capacity to change.
- ☐ Treat all students equitably. Invite them to point out behaviors or practices that discriminate.
- ☐ Relate teaching and learning activities to students' experience or previous knowledge.
- ☐ Encourage students to make choices in content and assessment methods based on their experiences, values, needs, and strengths.
- ☐ Provide challenging learning experiences involving higher order thinking and critical inquiry. Address relevant, real-world issues in an action-oriented manner.
- ☐ Encourage discussion of relevant experiences. Incorporate student dialect into classroom dialogue.
- ☐ Connect the assessment process to the students' world, frames of reference, and values.
- ☐ Include multiple ways to represent knowledge and skills and allow for attainment of outcomes at different points in time.
- ☐ Encourage self-assessment.

Engineering the Future will provide training in culturally responsive teaching to all of instructional staff at the project magnet schools and will provide follow-up coaching through the STEM Instructional Coaches at each site. Planned professional development in design thinking and project-based learning will link to culturally responsive teaching strategies and will enable challenging learning experiences involving higher-order thinking.

Socio-Economically Responsive Teaching

Albuquerque Public Schools also recognizes that poverty can impact students' school performance. The district is working with Eric Jensen, author of *Teaching with Poverty in Mind: What Being Poor Does to Kids' Brains and What Schools Can Do About It.* Jensen provides a training called "Teaching and Engaging with Poverty in Mind." Drawing from research, experience, and real school success stories, Jensen addresses:

- ☐ What poverty is and how it affects students in school;
- ☐ What drives change both at the macro level (within schools and districts) and at the micro level (inside a student's brain);
- ☐ Effective strategies from those who have succeeded and ways to replicate those best practices at your own school; and
- ☐ How to engage the resources necessary to make change happen.

A brain that is susceptible to adverse environmental effects is equally receptive to the positive effects of rich, balanced learning environments and caring relationships that build students' resilience, self-esteem, and character. ***Engineering the Future*** project instructional staff will participate in Jensen Learning training in order to better address the needs of low socio-economic status learners who may manifest the stress of poverty as trauma or self-defeating behavior in the classroom. This will allow magnet school teachers to craft a learning environment which is

responsive to the needs to these learnings and doesn't push them out of learning opportunities, as so many schools inadvertently do.

Heterogeneous Grouping and Project-Based Learning

Engineering the Future project instructional staff will use heterogeneous grouping as a strategy to foster interaction among students of different social, economic, ethnic, and racial backgrounds in classroom activities. Heterogeneous grouping is the practice of teaching children of different ages and/or ability levels together in the same classroom with access to the same curriculum. To the extent possible, all students with disabilities will be included and the instructional activities will be modified to make the same rigorous curriculum accessible to all students. When creating groups and assigning tasks, ***Engineering the Future*** instructional staff will take care to create groups which mix students of different genders, abilities, racial and ethnic backgrounds, and other factors. By working together, students will develop interpersonal relationships and a greater understanding of other perspectives. Heterogeneous grouping is especially powerful for students who may be struggling academically or questioning their abilities. Explicit development of collaborative learning strategies will be a part of the stated objectives of each projectbased learning experience. Capacity for academically productive collaboration is learned and must be specifically taught and consistently fostered. Ultimately, the magnet school program will provide all students with rich educational experiences designed to engage and inspire.

Constructivist Approach

The project-based learning activities that form the foundation of the ***Engineering the Future*** project are inherently constructivist in their approach. Constructivism is a theory -- based on observation and scientific study -- about how people learn. It says that people construct their own understanding and knowledge of the world, through experience and reflection. The role of

instructional staff in the ***Engineering the Future*** project will be to design and implement student-centered, active learning environments in which students can pursue inquiry as a learning strategy. Teachers will create classroom environments that foster high levels of engagement and value all learners as contributors to shared knowledge. Project-based learning strategies will support teachers in developing classroom practices that ensure all voices are heard and all learners contribute to creating new understandings and solving new problems.

(3) How it will ensure equal access and treatment for eligible project participants who have been traditionally underrepresented in courses or activities offered as part of the magnet school, e.g., women and girls in mathematics, science, or technology courses, and disabled students. (34 CFR280.31)

Albuquerque Public Schools is proposing to reduce minority group and low socio-economic status isolation at three proposed magnet schools – Mission STEM Magnet Elementary, Garfield STEM Magnet Middle and the North Valley STEM Academy – by attracting students who would otherwise attend private schools, charter schools or less isolated district schools to voluntarily enroll in the ***Engineering the Future*** magnet schools. The premise of the district's desegregation plan is that a rigorous curriculum, combined with innovative instructional practices and a supportive school culture and climate, will improve student academic achievement and make the schools a more appealing option to a wide variety of students and families. Albuquerque Public Schools is committed to providing equal access and treatment for eligible project participants who have been traditionally underrepresented in courses or activities offered as part of the magnet school (women and girls in mathematics, science, or technology courses, disabled students and/or English language learners). Through attention to crafting high quality, research-based educational experiences designed to be

accessible to all learners, Albuquerque Public Schools will carefully guard against stereotyping and unconscious bias in curriculum, instruction, assessment, and most importantly, relationships.

Equal Access and Treatment for Girls and Women in STEM

According to the National Girls Collaborative Project, our society continues to fail to support girls and women interested in STEM-based careers: 35.2% of chemists; 11.1% of physicists and astronomers; 33.8% of environmental engineers; 22.7% of chemical engineers; 17.5% of civil, architectural, and sanitary engineers; 17.1% of industrial engineers; 10.7% of electrical or computer hardware engineers; and 7.9% of mechanical engineers are women. The ***Engineering the Future*** project is designed to address this gap by infusing gender-equity issues into professional development and consciously designing experiences in which girls encounter strong, positive role models in STEM careers. Each magnet school will provide girls with access to and support in challenging STEM activities, and recruitment activities will be designed to encourage girls to participate. Instructional staff at each school will consciously examine their own attitudes towards science, technology, engineering and math and how these attitudes might be influencing their female students' attitudes towards their own abilities in these fields. Steps that Garfield STEM Magnet Middle School staff already taken in this area have paid off. In 2017, an all-girl robotics team won the regional Vex robotics tournament at the University of New Mexico and qualified to compete at the national tournament in Iowa. Having a successful female robotics team representing our school and community at a national level has act as catalyst for other middle school females to join a predominantly male robotics club.

Equal Access and Treatment for Students with Disabilities

All students with disabilities will be provided access to and will be included in all ***Engineering the Future*** project activities. The Albuquerque Public Schools Special Education Department will provide support to students with disabilities attending a project magnet school,

and all accommodations, modifications and supportive services (physical therapy, speech language therapy, behavioral supports, counseling) will be provided to students as outlined in their Individualized Educational Plans (IEPs). Instructional staff at the project magnet schools will differentiate instruction and provide modifications such that students with learning or other disabilities are able to access the curriculum and achieve at the same level as their peers without disabilities. The district's special education policy is based on placing students in the least restrictive environment and adapting that environment to meet the needs of the learners with disabilities. According to the United States Office of Disability Employment Policy, the employment rate for adults with disabilities is 30.2% while the employment rate for adults without disabilities is 73.2%. This gap of 40 percentage points out the reason it is so important to include students with disabilities in the ***Engineering the Future*** project in order to prepare these students for meaningful future careers.

Equal Access and Treatment for English Language Learners

Albuquerque Public Schools has a large (17%) and growing population of English Language Learners. APS policy calls for all English Language Learners to have access to alternative language services designed to meet the educational needs of all language minority students to enable them to effectively participate in the regular school program, thus ensuring equal access to a quality education. Schools are required to have a home language survey in place to identify and qualify students needing services, and a language proficiency assessment for program placement. All English Language Learners will have access to participate in an appropriate program, including sheltered English programs and bilingual programs. Sheltered instruction is an approach to teaching English language learners that integrates language and content instruction. The dual goals of sheltered instruction are to provide access to mainstream, grade-level content, and to promote the development of English language proficiency.

Albuquerque Public Schools also offers bilingual models, including two-way dual-language immersion, transition programs designed to transition students from their home language to English and maintenance programs designed to maintain proficiency in both languages once it is achieved.

All English Language Learners enrolled at ***Engineering the Future*** magnet schools will receive the appropriate services from trained ELL teachers. As with students who have disabilities, instructional staff at the project magnet schools will differentiate instruction and provide modifications such that students with who speak a language other than English are able to access the curriculum and achieve at the same level as their peers. Assessments will be modified so English Language Learners can show what they know in ways appropriate to their level of academic English knowledge and vocabulary. Project-based learning and hands-on demonstrations can be particularly effective means of doing this. Magnet school instructional staff will draw upon resources from Dual Language New Mexico (DLNM), an organization that supports bilingual education in New Mexico in order to strengthen their instructional strategies. District-based APS Translation and Interpretation Services will ensure that all project materials are translated for parents and that interpreters are available for family events and conferences as needed.

(4) The effectiveness of all other desegregation strategies proposed by the applicant for the elimination, reduction, or prevention of minority group isolation in elementary schools and secondary schools with substantial proportions of minority students.

(Section 4401(b)(1) of the ESEA, as amended by the ESSA)

Albuquerque Public Schools has proposed the creation of strong magnet schools with well-designed instructional programs and well-integrated themes as the foundation of its desegregation strategy. The district is committed to developing and investing in this effort as a

model for reducing minority group and low socio-economic status isolation. Albuquerque Public Schools also offers a robust intra-district transfer program. Through this program, students can apply for enrollment in any district school outside of their district-established attendance zone. In the 2015-2016 school year, 18.46% of students were attending school on a district-approved transfer. Through this program, students from low-performing schools (New Mexico Public Education Department F Grade for Past Two Years) have priority to transfer into higher performing schools. This often means transferring from a high minority, low socio-economic status school into the reverse. Albuquerque Public Schools believes that investments in magnet schools will build diversity through voluntary enrollment and will tap into the power of choice to create broadly improved educational outcomes.

Voluntary Magnet School Enrollment Evidence

Citation: Bifulco, R., Cobb, C. D., & Bell, C. (2009). Can interdistrict choice boost student achievement? The case of Connecticut's interdistrict magnet school program. Educational Evaluation and Policy Analysis, 31(4), 323–345. Meets What Works Clearinghouse Standards without resevations.

Citation Outcomes: Bifulco, Cobb, & Bell examined the effect of Connecticut's interdistrict magnet school program. In this program, students attending urban city schools could voluntarily apply for enrollment in magnet schools in suburban communities. Results indicated that attendance at an interdistrict magnet high school had positive effects on the math and reading achievement of city students and interdistrict magnet middle schools had positive effects of the reading achievement of all students.

Relevance to Proposed Project: This study of voluntarily enrollment in magnet schools through a lottery process has some relevance to the ***Engineering the Future*** project. It involved middle and high school students, as do the proposed APS magnet schools. It also involved

voluntary enrollment in the magnet schools. The researchers attempted to control for the effects of selection bias and demonstrated positive outcomes in academic achievement independent of any selection bias. Albuquerque Public Schools hopes to demonstrate the same results. The enrollment model used by APS however, if different that those one used in this study, as voluntary enrollment will take place intra-district and the movement of students will be to a majority Hispanic and low-income school, instead of the reverse. The sample size used in the study was 553 students.

(b) Quality of Project Design (30 points)

The Secretary reviews each application to determine the quality of the project design. In determining the quality of the design of the proposed project, the Secretary considers the following factors:

To ensure that all students are prepared for success in a rapidly changing world, Albuquerque Public Schools has engaged the community in developing an academic master plan and graduate profile. Key role groups – students, parents, teachers, school leaders, community members and business representatives -- were included in the development of the academic master plan through focus groups, community forums, online surveys and parent-teacher association meetings. Through this work, one clear vision emerged: all Albuquerque Public Schools students will attend high-quality schools responsive to their communities. The district also created a framework to assess whether or not schools are reaching that vision: surveys to measure school culture and climate, standardized tests to measure student academic achievement and attendance, truancy and extracurricular involvement to measure student engagement. Within this framework, the Office of Innovation was created with the premise that APS must recognize that learning is not one size fits all, and provide specialized magnet schools and programs with

unique learning environments that build on student interests, foster a passion for learning, and support learning needs.

The Office of Innovation has developed a magnet school framework based on the Magnet Schools of America standards of excellence as a basis for developing new and bringing established magnets to a high level of quality implementation. This framework gives definition to the term 'magnet school,' informs families of what they should expect from the magnet experience and provides the basis for each school's development. As defined by the district, a magnet school in Albuquerque Public Schools is a public school that has the autonomy to innovate, the support to integrate the magnet approach throughout the student experience, and the mission to deliver a fundamentally unique approach.

(1) The manner and extent to which the magnet school program will improve student academic achievement for all students attending the magnet school programs, including the manner and extent to which each magnet school program will increase student academic achievement in the instructional area or areas offered by the school, including any evidence, or if such evidence is not available, a rationale based on current research findings, to support such description. (Sections 4405(b)(1)(E)(i)and 4405(b)(1)(B) of the ESEA, as amended by the ESSA)

Through the ***Engineering the Future*** project, APS proposes to improve teaching and learning, increase academic achievement and improve students' knowledge, skills and aptitudes in STEM (Science, Technology, Engineering and Math) at Mission STEM Magnet Elementary School, Garfield STEM Magnet Middle School and the North Valley STEM Academy. In this project, Albuquerque Public Schools defines STEM not as a course, class, academic subject or specified unit of time within the school day. Instead, STEM is an interdisciplinary approach to learning which is interwoven throughout all curricular areas through specific magnet theme

objectives. These objectives are fostered through project-based learning, design thinking and multiple approaches to developing 21st century skills.

Ensuring that student achievement improves at the proposed magnet schools will require a systematic approach to actualizing the magnet school framework with the support of a matrix of district and Magnet Schools Assistance Program resources, substantial professional development, effective implementation systems, and a commitment to a culture of improvement and innovation. Albuquerque Public Schools' ***Magnet School Framework*** consists of four pillars with corresponding indicators that, taken as a whole, describe what makes a magnet school different from a comprehensive school. These pillars are: Leadership & Culture, Innovative Teaching & Learning, Equity & Personalization, and Family & Community Partnerships. The indicators are based on the Magnet Schools of America Standards of Excellence. The Framework applies to any magnet theme, and provides a basis for each school's magnet school plan.

The design of the ***Engineering the Future*** project is based on the APS ***Magnet School Framework's*** standards as described in Pillar 2: Innovative Teaching and Learning. These standards have been established to ensure that district magnet schools consistently apply the school-wide innovative teaching and learning magnet theme and that the magnet theme is aligned with New Mexico State Standards and Benchmarks. The ***Magnet School Framework*** standards related to innovative teaching and learning encompass five domains: Professional Learning, Curriculum, Instruction, Assessment and Environment, as described below.

1. ***Professional Learning***
    a. Collaborative professional learning is consistently experienced through, and connected to, the school-wide focus and results in classroom application.
2. ***Curriculum***

a. Progressive objectives that define knowledge, skills, and attributes that connect standards with the theme are clearly articulated, evident in all curricular areas, and vertically aligned.

b. Connection of the theme, philosophy and content standards is evident in a collaboratively developed curriculum that is horizontally and vertically aligned, documented, sequenced, and adjusted.

c. The magnet curriculum provides flexibility for differentiation, acceleration, and intervention.

3. Instruction

a. The school-wide approach toward innovative teaching and learning is evident in every classroom.

b. The school-wide instructional approach fosters high levels of student engagement and encourages student voice and choice in implementation.

4. Assessment

a. Vertically and horizontally aligned student progress indicators of knowledge, skills, and attributes align the content and the theme.

b. Classroom assessment reflects common expectations of academic rigor and theme objectives, using multiple indicators.

c. Relevant data provides comprehensive evidence of student learning and informs instructional adjustment.

5. Environment

a. The classroom and school environment communicate the uniqueness of the magnet school focus.

Professional Learning

The foundation of any school transformation lies in a shift of thinking that begins with adult learning. This shift of thinking, with structured support, leads to change in practice. This in turn leads to changes in results. Adult learning must be designed to engage learners in experiencing the kind of learning they are expected to create in the classroom. Thus, professional learning experiences must be designed with the goal of translation to the classroom at the forefront. Teachers cannot be expected to learn through sitting and listening, yet teach through engaging, hands-on, rigorous project based learning experiences. For this reason, a significant portion of resources in the ***Engineering the Future*** project will go towards supporting high-quality, STEM-related learning experiences for teachers.

If funded, Albuquerque Public Schools will hire a district based STEM Instructional Specialist to work closely with the school-based STEM Instructional Coaches to design responsive adult learning experiences and corresponding implementation supports to ensure the translation of adult learning to classroom practice. The coaching continuum -- ongoing learning, modeling, practice, observation, and feedback -- will form the core of the work of the Office of Innovation, district MSAP personnel, site MSAP personnel, and school leadership teams. The Learning Forward Standards for Professional Learning will help to guide the teams as they develop, implement, and modify customized professional learning.

The Learning Forward Standards for Professional Learning will form the basis of the ***Engineering the Future*** Leadership Council's regular meetings and will be used as a guide in onboarding the Council. The district STEM Specialist and STEM Instructional Coaches will be prepared to facilitate the curriculum design process through Wiggins and McTighe's *Understanding by Design*, and will be prepared to support adult learning throughout the project through the study of adult learning theory, the development of a toolkit of protocols, and ongoing peer observation and feedback. This core team will meet regularly with the MSAP Director and

the Executive Director of the Office of Innovation as a process development team to share experiences, successes, and support the learning of the team. Assessing progress of the implementation plan, making mid-course corrections, and ensuring that all teachers in the STEM magnet schools receive at least 40 hours of customized support will be the focus of the meetings. Quarterly, this team will meet in conjunction with the Magnet School Principals for next steps in process design.

Ample time for ongoing, job embedded professional learning is a critical component for success. The schedule of Mission STEM Magnet Elementary School allows for grade level collaboration three days a week and an additional block of grade level planning time. The schedule of Garfield STEM Magnet Elementary School is a double block, giving teachers daily time for collaboration and planning. The proposed North Valley STEM Academy schedule will be constructed to ensure ample time for application of professional learning standards and processes. In addition, all schools have two hours every twenty days that the principal can utilize for professional learning. Three district professional development days are typically provided, however, these days are on the negotiations table for 2017-2018 due to budget constraints. The MSAP budget will provide five additional Summer Institute days for professional development prior to the start of the contract and will add two hours per month to support ongoing professional learning. Additional funds have been incorporated into the grant proposal to provide Project Lead the Way training and for travel to national conferences and other learning opportunities.

Curriculum Aligned to State Standards and Integrated with Magnet Theme

The State of New Mexico adopted the Common Core State Standards in English Language Arts and Mathematics in 2010. Although these internationally benchmarked standards have been adopted by the State, the Common Core State Standards do not provide schools with

specific curriculum or teaching methods. These decisions have continued to be made at the local level by school boards, superintendents, principals and teachers. Due to a lack of resources and supports, most districts and schools have relied on published programs to guide curricular decisions instead of a backwards planning design that bases curriculum development in the depth of knowledge of the standards as intended. In many cases, the published materials are not fully aligned with the Common Core State Standards or lack sufficient rigor. The ***Engineering the Future*** project is designed to address this weakness, and part of the project's strong theory is that improved student academic achievement will begin with improved, integrated and aligned curriculum.

While the State has not yet formally adopted the Next Generation Science Standards (NGSS), the commonalities of the Standards of Mathematical Practice and the Capacities of the Literate Individual as the basis of the Common Core State Standards (CCSS) supports the development of the NGSS practices (***Figure 4***). These overlapping practices align with the International Society of Technology in Education's (ISTE) technology standards. Taken as an integrated whole, the CCSS, NGSS, and ISTE's National Educational Technology Standards (NETS) form the basis of the knowledge, understanding, and skills at the center of the ***Engineering the Future*** project.

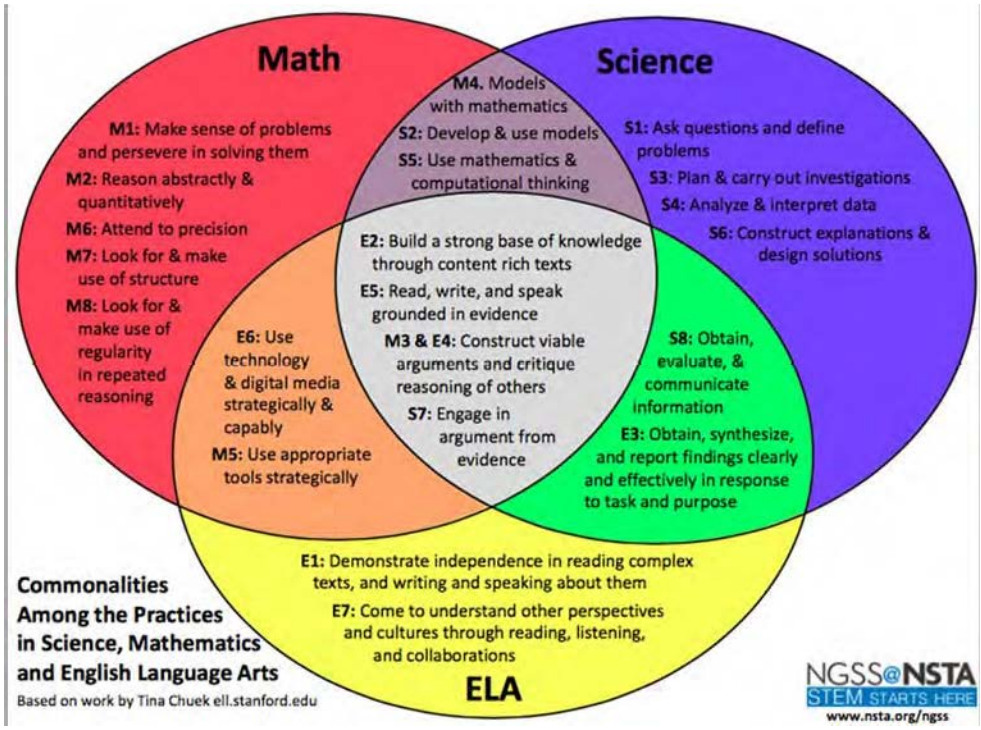

Figure 4: Overlapping Standards in Math, Science and English Language Arts

To develop a strong magnet school STEM-integrated curriculum, the professional development supporting ***Engineering the Future*** project implementation will include unwrapping and aligning CCSS, NGSS, and ISTE standards. A fully mapped curriculum will serve as the foundation of magnet school instruction. The creation of K-12 STEM theme objectives that describe the continuum of development of student attributes (design thinking, collaboration, problem solving, inquiry learning) will be developed and infused in all curricular and co-curricular experiences. Over the five years of the project, teachers will develop a vertically aligned sequence of authentic STEM infused project-based learning experiences as the core of the magnet curriculum. Initially, it will be necessary to shift away from the institutional practice of substituting curriculum materials for deep understanding of the CCSS and NGSS. This will require professional development to develop capacity in understanding the foundation of internationally benchmarked standards through Achieve the Core, the Association for

Supervision and Curriculum Development (ASCD), the National Science Teachers Association (NSTA) and engageNY resources. The MSAP STEM Specialist will coach and guide the STEM Instructional Coaches in selecting relevant resources and strategies for each staff to gain a strong grasp of the standards with the support of curated resources and strategies developed based on the needs of each staff.

With facilitation and support, knowledge of the standards will be applied to develop a year-long curriculum map of content and theme objectives. Standards across disciplines will be grouped into multi-disciplinary units. This work will be facilitated by the STEM Instructional Coaches with support and guidance from the STEM Specialist. The STEM Specialist will connect all levels to ensure K-12 vertical alignment and ensure that the curriculum is revisited and revised as needed throughout the project through the Instructional Councils at each proposed magnet school and the Engineering the Future Leadership Council. As detailed in the logic model for this project, instructional staff at the proposed magnet schools will create cross-curricular units of study aligned to state standards that integrate STEM concepts into core academic subjects. These cross-curricular units will be assessed through peer review at each school, facilitated by district MSAP staff. The Independent Evaluator will examine school practices for evidence of this upgrade to the curriculum and will document implemented fidelity at 80% or better in 90% of classrooms (Objective 2).

Interdisciplinary Learning

Developing effective instruction requires a dual focus on effective disciplinary pedagogy and a consistent school-wide approach that fosters inquiry, design thinking, and enduring skills development as described in the curriculum maps. The foundation of learning in every discipline lies in expressive and receptive communication. Thus, a focus reading, writing, listening, and speaking is critical to student achievement. Mission STEM Elementary School uses the Daily 5

as the structure for English Language Arts (ELA) instruction. Garfield STEM Magnet School has a double block of integrated ELA and Humanities, which gives context for the Common Core focus on non-fiction. APS high schools use Springboard as the ELA curriculum. To equip students to become literate individuals, a K-12 continuum of strategies to develop academic language, access complex text, communicate evidence-based claims, and build knowledge through multi-modal text will be implemented with emphasis on writing through all curricular areas.

Common Core mathematics are based in constructivist theory. Development and refinement of strong mathematical pedagogy will be based in Stanford's Mathematical Mindsets online professional development. The STEM Instructional Coaches will facilitate a blended learning approach to professional learning using the online professional development as a basis for the design process as applied to mathematical instruction. Strengthening pedagogy in mathematics will equip teachers to determine the best use of district math published programs.

Project Lead the Way

Engineering is the discipline most unfamiliar to teachers across the proposed sites. Project Lead the Way is a national provider of professional development and resources that allow teachers to engage their students in activity-, project-, and problem-based learning using hands-on, real-world activities, projects, and problems. Examples of the Project Lead the Way units available at the elementary school level include: Exploring Design, the Human Body, Animals and Algorithms, Light and Sound, Observing the Sun, Moon, and Stars, Animal Adaptions, Properties of Matter, The Changing Earth, Grids and Game, The Science of Flight, Stability and Motion, Variation of Traits, Collisions, Computer Systems, The Human Brain, Robotics and Automation, and Infection Detection, among others. These units help students understand the engineering and design process and the ways in which the knowledge and skills they develop in

the classroom may be applied in everyday life. A list of the Project Lead the Way modules for middle and high schools is given below:

Middle School Project Lead the Way

- Design and Modeling: Students discover the design process and develop an understanding of the influence of creativity and innovation in their lives. They are then challenged and empowered to use and apply what they've learned throughout the unit to design a therapeutic toy for a child who has cerebral palsy.
- Automation and Robotics: Students learn about the history and impact of automation and robotics as they explore mechanical systems, energy transfer, machine automation, and computer control systems. Using the VEX Robotics® platform, students apply what they know to design and program traffic lights, robotic arms, and more.
- Introduction to Computer Science 1: In this unit, students discover the principles of this fast-growing field. They develop computer science knowledge and skills by focusing on creativity and an iterative design process as they create their own basic apps using MIT App Inventor®.
- Introduction to Computer Science 2: In ICS 2, students continue to explore the fundamentals of the stimulating career path of computer science. They venture into text-based programming through Python and develop an app to crowdsource and analyze data on a topic of their interest.
- Energy and the Environment: Students are challenged to think big and toward the future as they explore sustainable solutions to our energy needs and investigate the impact of energy on our lives and the world. They use what they've learned to design and model alternative energy sources, as well as evaluate options for reducing energy consumption.

- Flight and Space: The exciting world of aerospace comes alive through Flight and Space. Students explore the science behind aeronautics and use their knowledge to design, build, and test an airfoil.
- Green Architecture: In this unit, students learn how to apply green concepts to the fields of architecture and construction. They explore dimensioning, measuring, and architectural sustainability and apply what they have learned to design affordable housing units using Autodesk's® 3D architectural design software.
- Medical Detectives: Students play the role of real-life medical detectives as they analyze genetic testing results to diagnose disease and study DNA evidence found at a "crime scene." They solve medical mysteries through hands-on projects and labs, investigate how to measure and interpret vital signs, and learn how the systems of the human body work together to maintain health.

High School Project Lead the Way

- Introduction to Engineering Design: Students dig deep into the engineering design process, applying math, science, and engineering standards to hands-on projects like designing a new toy or improving an existing product.
- Principles of Engineering: Students explore a broad range of engineering topics including mechanisms, strength of structure and materials, and automation, and then they apply what they know to take on challenges like designing a self-powered car.
- Aerospace Engineering: Students explore the physics of flight and bring what they are learning to life through hands-on projects like designing a glider and creating a program for an autonomous space rover.

- Civil Engineering and Architecture: Students learn important aspects of building and site design and development, and then they apply what they know to design a commercial building.
- Computer Integrated Manufacturing: Students discover and explore manufacturing processes, product design, robotics, and automation, and then they apply what they have learned to design solutions for real-world manufacturing problems.
- Computer Science Principles: Using Python as a primary tool, students develop computational-thinking skills and tackle challenges like designing apps to solve real-world problems for clients.
- Digital Electronics: Students explore the foundations of computing by engaging in circuit design processes to create combinational logic and sequential logic (memory) as electrical engineers do in industry.
- Environmental Sustainability: Students investigate and design solutions in response to real-world challenges related to clean and abundant drinking water, food supply, and renewable energy.
- Engineering Design and Development: Students identify a real-world challenge and then research, design, and test a solution, ultimately presenting their unique solutions to a panel of engineers.

Project Lead the Way Implementation

Mission Elementary School currently does not use Project Lead the Way. When Garfield STEM Magnet School opened in 2014, two teachers were trained to implement the Project Lead the Way Design and Modeling unit and the Automation and Robotics unit. In order to implement an engineering focus at the two new magnet schools and to revise Garfield's engineering focus, Albuquerque Public Schools proposes to train teachers in Project Lead the

Way instruction and to use Project Lead the Way as a foundation of the ***Engineering the Future*** project. Based on Garfield's experience, immediate access to engineering experiences for students will help build excitement around the magnet school theme and generate positive word-of-mouth marketing that will help build parent interest in enrollment. Meanwhile, the STEM Instructional Coaches will support incorporating engineering habits through all multidisciplinary units through systems thinking, problem finding, visualizing, improving, problem solving, and adapting. As staff capacity around implementing engineering practices increases, the ***Engineering the Future*** project will continue to invest in teachers becoming Project Lead the Way trained.

Project Lead the Way Evidence

Citation: Van Overschelde, James P. (Spring 2013) Project Lead The Way Students More Prepared For Higher Education. Texas State University. American Journal of Engineering Education, 4(1). Not reviewed by the What Works Clearinghouse.

Citation Outcomes: Van Overschelde examined low-income and non low-income high school students in Texas who had been enrolled in Project Lead the Way (PLTW) on a variety of measures, including meeting the state's mathematics minimum standard and enrollment in post-secondary education. A statistically matched group of students who did not enroll in Project Lead the Way served as the control group. Students who participated in PLTW were more prepared for higher education. Specifically, and in comparison to matched, non-PLTW students, PLTW students scored higher on the state's mathematics assessment, a higher percentage met the state's minimum Mathematics standard, and a higher percentage met the college-ready Mathematics standard.

Relevance to Proposed Project: This study of Project Lead the Way as an intervention shows promise in increasing mathematics achievement and college enrollment in low-income

high school students. As Albuquerque Public Schools proposes to serve low-income high school students and to improve student outcomes related to mathematics achievement and the enrollment in post-secondary education, this study has direct relevance to the ***Engineering the Future*** project. While the sample size used in the study is much larger than the invention group in Albuquerque (2,876 students were in the PLTW group and 2,876 students were in the control group in the study), the characteristics of students are similar to those who will be served in Albuquerque.

Project-Based Learning

The school-wide approach across all ***Engineering the Future*** schools will be Project-Based Learning (PBL). PBL is well-documented as an approach that fosters deep student inquiry while building 21st century skills. Goals for 21st century learning emphasize mastery of significant academic content, which also is the foundation of any well-designed project. Comparisons of learning outcomes in PBL versus more traditional, textbook-and-lecture driven instruction show that's tudents learning through PBL retain content longer and have a deeper understanding of what they are learning (Penuel & Means, 2000; Stepien, Gallagher & Workman, 1993). In specific content areas, PBL has been shown to be more effective than traditional methods for teaching math, economics, language, science, and other disciplines (Beckett & Miller, 2006; Boaler, 2002; Finkelstein et al., 2010; Greier et al., 2008; Mergendoller, Maxwell, & Bellisimo, 2006). On high-stakes tests, PBL students perform as well or better than traditionally taught students (Parker et al., 2011). In the high-poverty attendance area of the ***Engineering the Future*** schools, an engaging approach is needed to ensure equitable access to high quality learning. PBL shows promise as a strategy for closing the achievement gap by engaging lower- achieving students (Boaler, 2002; Penuel & Means, 2000). PBL can work in different types of schools, serving diverse learners. (Hixson, Ravitz, & Whisman, 2012). PBL

also can provide an effective model for whole-school reform (National Clearinghouse for Comprehensive School Reform, 2004; Newmann & Wehlage, 1995; Ravitz, 2008).

PBL design is based on **Key Knowledge, Understanding, and Success Skills**, focused on student learning goals, including standards-based content and skills such as critical thinking/problem solving, collaboration, and self-management. The curriculum developed by the ***Engineering the Future*** schools will define the knowledge, understanding, and skills to be developed. PBL experiences are based on a **Challenging Problem or Question**, framed by a meaningful problem to solve or a question to answer, at the appropriate level of challenge. PBL fosters **Sustained Inquiry**, as students engage in a rigorous, extended process of asking questions, finding resources, and applying information. PBL emphasizes relevance through **Authenticity**, as project features real-world context, tasks and tools, quality standards, or impact – or speaks to students' personal concerns, interests, and issues in their lives. Student engagement through **Student Voice & Choice** as students make some decisions about the project, including how they work and what they create. PBL develops **Reflection** as students and teachers reflect on learning, the effectiveness of their inquiry and project activities, the quality of student work, obstacles and how to overcome them. Students give, receive, and use feedback to improve their process and products through **Critique & Revision**. Students make their project work public by explaining, displaying and/or presenting it to people beyond the classroom through a **Public Product**.

Teachers will receive PBL training from trainers who have been trained through the Buck Institute of Education, and all project partners will use PBL as the foundation for their work with the schools. The schools will use the curriculum design methodology from the Buck Institute, using a unit plan template based on Buck Institute's Project Overview Template. Each school's professional learning community (PLC), guided by the magnet STEM Instructional Coaches and

facilitated by the STEM Instructional Specialist, will use school created curriculum maps to establish overarching goals, concepts, essential questions, content, skills, assessments, resources and their alignment. By using the curriculum unit template based on the work of the Buck Institute, PLC teams will create magnet themed, inquiry-based PBL units across curriculum areas that address different learning needs (including the needs of ELLs and students with disabilities), and meet the Common Core and state standards. Teachers will spiral curriculum concepts and skills for deeper student understanding, integrate Common Core literacy standards into PBL, and develop rubrics and clear indicators that will result in increasingly higher quality performances and products.

Over the first three years of the ***Engineering the Future*** project, schools will develop and implement themed PBL units of study that are peer reviewed and that will result in students receiving integrated magnet theme instruction for at least 3 (year 1), 6 (year 2) and 10 (year 3) hours per week. Development of PBL experiences is an iterative design process that the STEM Instructional Coaches and STEM Specialist will facilitate and support. Phases 1 and 2 -- Discovery and Interpretation --will occur through the study of standards and development of an aligned curriculum map. Phase 3 –Ideation - will begin after initial introductory PBL training. Instructional staff will create a PBL prototype, selecting the most important components of PBL design upon which to focus. The STEM Instructional Coaches, with support and guidance from the STEM Specialist, will facilitate PBL development. Early PBL experiences should be attempted based on one content area within the curriculum map. Phase 4 – Experimentation – takes places when teachers implement the first multi-disciplinary PBL with students. STEM Instructional Coaches and the STEM Specialist will organize peer asset walks and debriefs for teachers to share and debrief practices. Phase 5 – Evolution - will be a guided reflection on refining and improving PBL design components and adding new elements for the next PBL

experience.

The Role of the STEM Specialist & Instructional Coaches

STEM Instructional Coaches, with support from the STEM Instructional Specialist, will facilitate the refinement of PBL design and practice over the five years of the grant to develop high-level implementation with demonstrable impact on student learning outcomes. The STEM Instructional Coaches and STEM Specialist will also have the capacity for onboarding new teachers into PBL implementation. The Buck Institute Project Design Rubric will serve as an implementation tool to self- and peer- evaluate and inform next steps in PBL development. The PBL School Rubric will be used as an implementation gauge by the ***Engineering the Future*** Leadership Council and each school's Instructional Council.

Integration of Technology

Project-Based Learning in the 21st century classroom blends the use of technology as a tool for learning and as a tool for communicating learning. Mission Elementary School is currently working with the district's Technology Integration Specialist to build capacity in supporting learning with technology. The Instructional Coach is a qualified Apple Vanguard trainer, and the principal and one teacher are currently in the Apply Vanguard Training program. Garfield STEM Magnet Middle School is working on implementation of Google Classroom and using multimodal text through the district's Technology Integration Specialist. Albuquerque Public Schools currently is implementing a multi-year capital strategy to increase equity and access to instructional technology in every classroom. The APS Technology Department supports schools in developing technology integration plans and will continue to support the three ***Engineering the Future*** schools. The STEM Specialist and STEM Instructional Coaches will model the role of technology in professional development so teachers experience learning in a blended format and become equipped to use technology as a lever to change the learning

model to one of student-driven, inquiry-based learning. The implementation of PBL with transformative use of technology requires substantial change in the execution of the teacher's role. Teachers, guided by MSAP staff, will learn to become facilitators of learning. The SAMR model (substitution, augmentation, modification, and redefinition) will be used as a guide in designing professional learning experiences and, ultimately, student experiences as well. To support the actualization of classroom technology to transform student learning, professional development in ISTE digital learning pathways will be integrated into the curricular PBL design process.

Mastering the components of Project-Based Learning is an iterative long-range process , beginning with a rigorous, integrated, standards-based, STEM theme-infused curriculum. The first three years of the grant will be devoted to developing high quality, peer reviewed units that integrate the magnet theme with core academic subjects for at least 3, 6 and 10 hours per week, for all students, by the end of years 1, 2 and 3 respectively. The final two years of the grant will focus on revision and improvement, resulting in a sustainable curriculum and embedded instructional approach.

Universal Design for Learning

Ensuring the academic success of all students requires attention to Universal Design for Learning principles, differentiated instruction, and strategies to shelter language for English Language Learners. The APS Special Education, Curriculum and Instruction, and Language & Cultural Equity Departments provide training and technical assistance to schools in support of all students. ***Engineering the Future*** schools, STEM Instructional Coaches, and district resource teachers will ensure that specific strategies that meet student needs are selected apprpropriatly, deployed effectively, monitored, and adjusted as needed to maximize student success.

Differentiated Instruction

Differentiated instruction means creating multiple paths so that students of different abilities, interests or learning needs experience equally appropriate ways to absorb, use and develop concepts as a part of the daily learning process (Tomlinson, 1999, 2001, 2003). It allows students to take greater responsibility and ownership for their own learning, and provides opportunities for peer teaching and cooperative learning. In preparation for differentiating, the teacher diagnoses the difference in readiness, interests and learning styles of all students in the class. Differentiation varies the content, processes or product for each group in the class. The essential curricula concepts will be the same for all students but the complexity of the content, learning activities and/or products will vary so that all students are challenged and no students are frustrated. Differentiated instruction supports "teaching up," rather than watering down. Project-Based Learning and other strategies discussed in this application support differentiated instruction for all students.

Improving the Academic Achievement of Students in Need of Greater Assistance

When needed, students will be given additional academic support. For example, for literacy, Response to Intervention (RtI) is used. (Please note that studies that meet the What Works Clearinghouse evidence standards have shown that RtI is an effective strategy for improving both English language arts and mathematics skills of students.) RtI provides services and interventions to students who struggle with learning at increasing levels of intensity. The first step to intervention is to ensure that all students receive a high-quality instructional program in their core instruction (Tier I) with curricula aligned to CCSS and clear benchmarks and grade level expectations. Staff closely monitors student progress at each stage of intervention and use this data to make decisions about the need for further instruction and/or intervention. Tier 2 instruction provides remediation on skills not mastered, three to five times a week, through small group, targeted instruction and specific intervention curriculum. Albuquerque

Public Schools implements to DataWise approach to examining the problems of implementation. All ***Engineering the Future*** schools will have data teams for every grade and content area, and all teachers will meet for a minimum of 2 hours per month to analyze school and individual student data, and develop classroom action plans to meet student needs.

Assessment

Building on the themed curriculum developed by the schools' PLCs, magnet school staff will develop specific magnet standards that indicate what students will know and accomplish as a result of the school's magnet theme. As a result, when parents and/or students select a magnet school they will have a strong sense of what will be expected and what they will accomplish in the magnet program. The development of specific magnet standards will be tied directly to the design and implementation of magnet curriculum and will help parents and students to know what is unique about each magnet school. Magnet standards for the ***Engineering the Future*** project will be based on engineering habits of mind and also will be aligned with and integrated into the Common Core standards and state standards.

To create magnet standards, teachers will begin by developing performance standards for the exiting grades that reflect the knowledge and skills that are important for students to attain and that are unique to the magnet program, while also supporting the Common Core and state standards. The magnet standards will reflect the knowledge/content to be learned, the skills the student will need to know and use to create products, the performance or product and how good is good (the rubric that will be used to judge whether the student has attained the standard). The magnet standards will become part of the magnet themes, units and lessons throughout the year. The schools supported by this grant will develop exit criteria based on their magnet standards. Magnet standards will be based in design thinking, engineering habits of mind, and 21st century skills.

The vertical articulation of content and theme objectives will ensure consistency in developing engineering habits of mind from kindergarten through high school graduation. Alignment of habits with CCSS, NGSS and ISTE standards will form magnet theme objectives in each grade level. The United Kingdom's Royal Academy of Engineering's report, "Thinking like an engineer, Implications for the education system," will be studied for applicable and relevant concepts that will guide theme objective development.

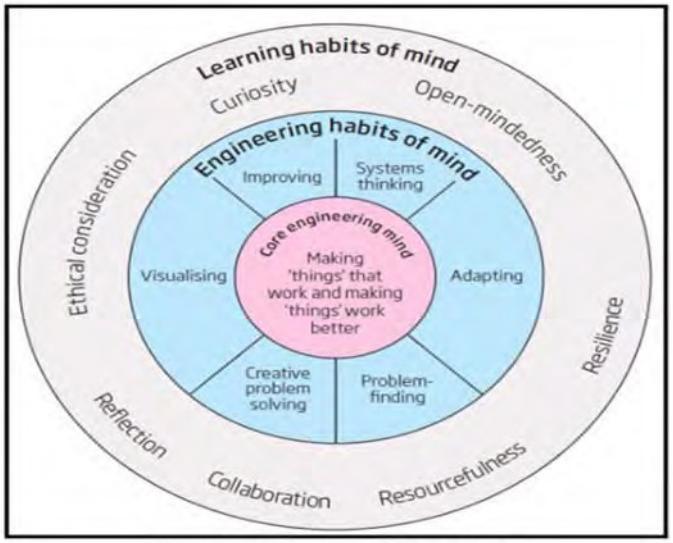

Figure 1. Engineering Habits of Mind

To assess student progress in content and theme objectives, Buck Institute of Education rubrics for collaboration, creativity & innovation, and critical thinking will be used along with NewTech Network rubrics for oral communication. A rubric for design thinking will be developed that includes engineering habits of mind and use of technology. An implementation rubric of all indicators in the Magnet School Framework is in development, and will be used as a program assessment tool to ensure quality.

Environment

The physical environment of a magnet school should "scream the theme" of integrated STEM teaching and learning, and should reflect the collaborative nature of Project-Based

Learning. Common areas and classrooms should be viewed as canvases to paint the picture of what makes a magnet school experience unique and compelling. Instructional staff in a magnet school should communicate consistent positive expectations for all students and serve as strong role models for magnet theme interest and excitement. Developing a school culture and climate which combines warm and supportive relationships with high expectations and an increasing level of challenge will be crucial to the success of the ***Engineering the Future*** magnet schools.

(2) The extent to which the applicant demonstrates that it has the resources to operate the project beyond the length of the grant, including a multi-year financial and operating model and accompanying plan; the demonstrated commitment of any partners; evidence of broad support from stakeholders (e.g.,State educational agencies, teachers' unions) critical to the project's long term success; or more than one of these types of evidence. (34 CFR 75.210)

Albuquerque Public Schools has a multi-year financial and operating model that will allow it to sustain the ***Engineering the Future*** project beyond the length of the grant. As mentioned previously in this application, the district has established the Office of Innovation in order to coordinate magnet school initiatives and to ensure that these schools have resources and support from the district sufficient to allow magnet schools to fulfill their missions. At the end of Magnet Schools Assistance Program funding, Albuquerque Public Schools will continue to fund the magnet initiative through its existing revenue streams, including local, state and federal funding and support from private foundation and corporations. The district currently successfully sustains over a dozen magnet schools using this strategy, including a New Tech Network high school and an early college high school on a community college campus.

Albuquerque Public Schools uses a site-based budgeting model that solicits input from district staff as well as school leadership in order to create a plan for expenditures which complies with all State of New Mexico provisions for the education of students and is aligned

with the school's goals of improving academic achievement and closing the achievement gap. This site-based budgeting model is sensitive to student enrollment and allocates schools more instructional staff when enrollment increases. Under this model, school principals and Instructional Councils can use discretionary funds within their budgets to support the implementation of their magnet school theme, including making investments in professional development, magnet theme specific supplies, specialized materials and needed technology. School principals gather input from instructional staff, parents, students and other stakeholders in order to craft the school's budget within the parameters set by the district's budget office.

The MSAP Project Director, with the help of the Executive Director of Innovation, will coordinate the creation of a sustainability plan for magnet school operations with input from multiple stakeholders, specific to each school participating in the project. The sustainability plan will determine which needs are one-time investments that do not need to be sustained, which needs can be met through existing district resources and which needs will require ongoing support from either the school's site budget or from resources flowing through the district's Office of Innovation. The MSAP Project Director will also work closely with the district's Grant Writer to identify potential resources to meet ongoing needs. By including financial planning into the grant activities from the beginning of year 1, district and school leadership will use a strategic approach to sustainability and will consider the use of existing federal Title I, Title II and Title IV funding steams as a means to sustain the ***Engineering the Future*** project, should those funding sources be available in 2022. Increased enrollment may also serve as its own engine of sustainability. To the extent that the project magnet schools draw students who are currently homeschooled, enrolled in private school or enrolled in a public charter schools, each student new to Albuquerque Public Schools will generate over $7,000 in state SEG funding annually. In Table 5, the district has made a good faith effort to provide information on potential

feeder schools for this project, but with 141 district schools, 54 charter schools and dozens of private schools, the actual number of feeder schools is difficult to estimate.

The ***Engineering the Future*** project has broad support from a variety of community partners, as evidenced by the letters of support included in the appendix. If funded, the district will create a STEM Magnet School Steering Committee of union representation, industry partners, institutes of higher education, STEM-based nonprofit organizations, thought partners and representatives from the philanthropy community to provide strategic feedback to the project, particularly in the alignment to post-secondary outcomes and pathways to sustainability. As three of the largest employers of STEM professionals in New Mexico, connections with Intel, Sandia National Laboratories and Kirtland Air Force Base will be particularly important to develop over the grant period. Other significant partnerships include the New Mexico Space Studies Group, the High Desert Amateur Radio Club, the Air Force Research Lab, the University of New Mexico STEM-H, Explora, New Mexico State University's Department of Engineering, Project Lead the Way, the National Museum of Nuclear Science and History, the City of Albuquerque, Inquiry Facilitators and other state and local organizations with an interested in or capacity to engage in STEM learning activities and alignment.

(3) The extent to which the training or professional development services to be provided by the proposed project are of sufficient quality, intensity, and duration to lead to improvements in practice among the recipients of those services. (34 CFR 75.210)

The foundation of any school transformation lies in a shift of thinking that begins with adult learning. This shift of thinking, with structured support, leads to change in practice. This in turn leads to changes in results. Adult learning must be designed to engage learners in experiencing the kind of learning they are expected to create in the classroom. Thus, professional learning experiences must be designed with the goal of translation to the classroom

at the forefront. Teachers cannot be expected to learn through sitting and listening, yet teach through engaging, hands-on, rigorous project based learning experiences. For this reason, a significant portion of resources in the ***Engineering the Future*** project will go towards supporting high-quality, STEM-related learning experiences for teachers.

If funded, Albuquerque Public Schools will hire a district based STEM Instructional Specialist to work closely with the school-based STEM Instructional Coaches to design responsive adult learning experiences and corresponding implementation supports to ensure the translation of adult learning to classroom practice linked to student learning outcomes. The coaching continuum -- ongoing learning, modeling, practice, observation, and feedback -- will form the core of the work of the Office of Innovation, district MSAP personnel, site MSAP personnel, and school leadership teams. The Learning Forward Standards for Professional Learning will help to guide the teams as they develop, implement, and modify customized professional learning. These standards will form the basis of the ***Engineering the Future*** Leadership Council's regular meetings and will be used as a guide in onboarding the Council. The district STEM Specialist and STEM Instructional Coaches will be prepared to facilitate the curriculum design process through Wiggins and McTighe's *Understanding by Design*, and will be prepared to support adult learning throughout the project through the study of adult learning theory, the development of a tool kit of protocols, and ongoing peer observation and feedback. This core team will meet regularly with the MSAP Director and the Executive Director of the Office of Innovation as a process development team to share experiences, successes, and support the learning of the team. Assessing progress of the implementation plan, making mid-course corrections, and ensuring that all teachers in the STEM magnet schools receive at least 40 hours of customized support will be the focus of the meetings. Quarterly, this team will meet in conjunction with the Magnet School Principals for next steps in process design.

Ample time for ongoing, job embedded professional learning is a critical component for success. The schedule of Mission STEM Magnet Elementary School allows for grade level collaboration three days a week and an additional block of grade level planning time. The schedule of Garfield STEM Magnet Elementary School is a double-block, giving teachers daily time for collaboration and planning. The proposed North Valley STEM Academy schedule will be constructed to ensure ample time for application of professional learning standards and processes. In addition, all schools have two hours every twenty days that the principal can utilize for professional learning. Three district professional development days are typically provided, however, these days are on the negotiations table for 2017-2018 due to budget constraints. The MSAP budget will provide five additional Summer Institute days for professional development prior to the start of the contract and will add two hours per month to support ongoing professional learning. Additional funds have been incorporated into the grant proposal to provide Project Lead the Way training and for travel to national conferences and other learning opportunities.

(4) The extent to which the proposed project is supported by strong theory (as defined in this notice). (34 CFR 75.210)

Albuquerque Public Schools uses the following logic model as the basis for the project's theory of action. If teachers receive sufficient, targeted and high-quality professional development and appropriate resources, their ability to implement project-based learning, Project Lead the Way activities and other activities in support of the magnet school theme will improve (Objective 5). If the magnet school offers a high-demand theme in which the community has expressed interest and makes the opportunity to enroll in the magnet school widely known, then students will enroll in the school and racial and socio-economic isolation will be reduced (Objective 1). If teachers integrate the magnet school theme across the curriculum and link

activities to a rigorous curriculum build on State standards, student academic performance as measured by State assessments will improve (Objective 2). If students are exposed to real world, performance-based engineering challenges such as Project Lead the Way, their interest and engagement in STEM will increase, leading to increased enrollment in college and preparation for careers (Objective 4). If magnet schools consciously engage both parents and the larger community, the magnet schools will be more responsive to the community and more likely to retain students (Objective 6).

Albuquerque Public Schools, Engineering the Future (*EF*) Logic Model

Resources	Project Inputs	Project Outputs	Student Outcomes	
			Objectives	*5 Year Outcomes*
MSAP Project Director, Contracted Marketing Specialist, APS Communications Department	***RECRUITMENT*** •Print, video and web materials produced in multiple languages. •Open houses, community events & other outreach held. •Accessible application process designed. •Advertising placed in strategic outlets.	Recruitment plan designed to meet enrollment targets: •Print, video and web materials produced in multiple languages exist. •N people attend open houses, community events & other outreach held. •N families use accessible application process.	PM 1.1 & 1.2: Annually reduced minority group isolation and low-SES isolation.	Magnet schools have significantly reduced minority group and low-SES student isolation.
			PM 1.3 & 1.4: Annually increased magnet school enrollment overall and voluntary enrollment from outside school attendance zones.	Magnet schools are well established with stable enrollment. Applications for enrollment come from throughout district.
MSAP Project Director, STEM Specialist, STEM Instructional Coaches, Contracted PD	***CURRICULAR ALIGNMENT*** •*EF* staff develops high-quality units integrating magnet theme with core academic subjects. •*EF* staff infuses units with new and/or improved instructional practice. •Instructional and *EF* staff review and improve units of study.	•Cross-curricular units of study aligned to state standards exist. •Evidence of *EF* staff curricular review and upgrade exists. •Implemented fidelity (80% or better) in 90% of classrooms.	PM 2.1: Improved alignment of cross-curricular units of study with state learning standards.	The quality of classroom instruction improves and demonstrates greater alignment with state standards.
			PM 2.2: Increased math and reading achievement on annual state assessments for all students and all subgroups.	Robust reading and math score improvements for minority and low SES students after 5 years.
MSAP Project Director, STEM Specialist, STEM Instructional Coaches, Contracted PD	***INTEGRATION OF THEME*** Systemic reform of school practices includes: •Specific classes related to the STEM magnet school theme developed and implemented. •Units related to the STEM magnet school theme developed and implemented in non-STEM classes.	Systemic reform of school practices includes: •N staff participating in specific PD related to integration of STEM magnet school theme.	PM 3.1 & 3.2: Increased integration of magnet theme into classroom instruction.	Magnet theme fully integrated into classroom instruction. Systemic reform of curriculum and practices achieved.
MSAP Project Director, STEM Specialist, STEM Instructional Coaches, Contracted PD	***COLLEGE & CAREER PREPARATION*** STEM learning opportunities increase: •Set of project-based STEM engineering challenges developed. •Rubric and expectations for success on project-based STEM engineering challenges developed.	STEM learning opportunities increase:•N project-based STEM engineering challenges developed. •Rubric and expectations for success on project-based STEM engineering challenges exists. •N connections to STEM learning challenges sponsored by organizations.	PM 4.1: Increased knowledge of and interest in STEM careers evidenced by students.	Students are more likely to pursue post-secondary education and/or careers in STEM fields.
			PM 4.2 & 4.3: Increased science achievement on annual state assessments for all students and all subgroups.	
STEM Specialist, STEM Instructional Coaches, Contracted PD	***CAPACITY & SUSTAINABILITY*** At least 40 hours of high quality, STEM relevant professional development planned and implemented in each year of the grant.	N teachers receive at least 40 hours of high quality, STEM relevant professional development in each year of the grant.	PM 5.1 & 5.2: Increased STEM content knowledge, skills and abilities evidenced by instructional staff through sufficient dosage of PD.	Each magnet school has in place a plan to address the elements of the magnet school framework and the need for ongoing PD of new teachers.
MSAP Project Director, Marketing Specialist, Steering Committee	***COMMUNITY CONNECTIONS*** •N partnerships with STEM institutions. •N connections to STEM learning challenges sponsored by organizations developed. • Parent engagement activities held: workshops, phone calls, emails, open houses, exhibitions, and tours.	• N parent engagement includes workshops, phone calls, emails, open houses, exhibitions, and tours held.	PM 6.1 & 6.2: Increased parental engagement in and satisfaction with their students' educational experience.	Increased parental volunteering and satisfaction. Improved annual retention rates of transfer, neighborhood school students and subgroups.

(c)Quality of Management Plan (15 points) (34 CFR 75.210)

(1) The adequacy of the management plan to achieve the objectives of the proposed project on time and within budget, including clearly defined responsibilities, timelines, and milestones for accomplishing project tasks.

Albuquerque Public Schools has created a thorough and well-considered plan to ensure effective management of the ***Engineering the Future*** project, including accomplishing the project tasks designed in the logic model on time and within budget. Responsibility for implementing the ***Engineering the Future*** project's management plan will rest with the Executive Director of the Office of Innovation Deborah Elder, who will hire and supervise the MSAP Project Director. The ***Engineering the Future*** project involves networking and communication between all stakeholders through a mix of formal and informal strategies, designed to ensure that the project is fully aligned with the district's Academic Master Plan, has a network of support throughout the district and clear lines of communication to key decision makers. This includes engaging a number of district departments and efforts, including the Department of Curriculum and Instruction, the Student Service Center, the Office of Accountability and Reporting, the Grants Management Department, the Human Resources Department and the Division of Student, Family and Community Supports. The ***Engineering the Future*** project will benefit from the consistent feedback, reflection and dissemination of information provided by a strong management infrastructure as the implementation of the project takes shape.

The ***Engineering the Future*** project logic model is the foundation of the project and the accomplishment of the project objectives will drive the management plan described in this proposal. Key positions for the accomplishments of these objectives include the Associate Superintendent of Equity and Access, the Executive Director of the Office of Innovation, the

MSAP Project Director, the STEM Specialist, one STEM Instructional Coach at each of the three project magnet schools, the principals at each of the three project magnet schools, and the members of the Instructional Councils at each of the three project magnet schools. Individuals with crucial supportive roles include the Executive Director of the Student Service Center, responsible for accepting and processing applications for transfer into magnet schools, the STEM Instructional Manager, responsible for coordinating district-wide STEM professional development, the Director of the Grants Management Department, responsible for the fiscal monitoring of all grant funds, and the Executive Director of Communications, responsible for the district's communication and outreach efforts. All of these individuals and departments will support the project implementation, under the leadership of the Executive Director of Innovation.

The ***Engineering the Future*** project will build multiple structures of oversight and collaboration to develop a vision for the project as a whole. To build connections between the K-12 STEM educational pathway, post-secondary STEM education and STEM careers, the Executive Director of Innovation will convene a quarterly Magnet School STEM Steering Committee, comprised of the Superintendent, other district leadership, university representatives, STEM professionals, STEM-focused non-profit professionals, magnet school leadership and staff, and magnet school parent representatives. The role of the Magnet School STEM Steering Committee will be to review project progress, identify opportunities, establish strategic direction, build relationships with key partners and research opportunities to integrate the project with existing STEM structures and funding streams in order to build sustainability. The Magnet School STEM Steering Committee will help district and school project implementation staff to hone the school's appeal to potential students, identify out-of-school STEM learning opportunities and ensure that the K-12 STEM pathway prepares students for success in college

and career in STEM fields. The members of the Magnet School STEM Steering Committee serve as ambassadors for the ***Engineering the Future*** project's vision in the community.

At the school level, each magnet school participating in the ***Engineering the Future*** project will build a site-based Instructional Council to provide leadership to the project. The STEM Instructional Coaches will serve on the Instructional Council, along with the Magnet School Principal and other school staff as defined by the negotiated agreement. The Instructional Council makes site-based decisions for the school and examines data in order to shape decision-making. Attendance at Instructional Council meetings can allow for visitors as issues arise and parents and other stakeholders can participate in meetings in order to gain a fuller perspective on issues and problems. The STEM Specialist, MSAP Project Director and the Executive Director of the Office of Innovation will meet at least monthly with the Instructional Council of each magnet school to facilitate discussion, report progress and share resources.

At the district level, the Executive Director of the Office of Innovation will convene a monthly ***Engineering the Future*** Leadership Council, consisting of the MSAP team, school site administrators, the independent evaluator and the Associate Superintendent of Equity and Access to meet and discuss implementation of the grant. Data related to recruitment, enrollment, retention, student academic performance, implementation of the STEM magnet theme and professional development will be reviewed and implementation will be adjusted as needed to meet project objectives. Monthly meetings will rotate between the three school sites and the district office in order to facilitate the sharing of project accomplishments and the sharing of best practices across sites. Together, the Magnet School STEM Steering Committee, the ***Engineering the Future*** Leadership Council and each magnet school's Instructional Council will provide a robust leadership and project management structure designed to incorporate the viewpoints of many stakeholders.

An ***Engineering the Future Project Implementation Plan*** based on the objectives defined in the logic model and incorporating personnel responsible and timeframes follows. Please see the project evaluation section for a more detailed discussion of the performance measures for each objective.

***Objective 1 (Reducing Isolation)*:** All proposed magnet schools will reduce minority group isolation and increase socioeconomic integration through recruitment and enrollment activities designed to attract voluntary enrollment of non-Hispanic and non-low-income students from outside the neighborhoods in which the schools are located.		
Project Activity	***Personnel Responsible***	***Time Frame***
Meet with key stakeholders in the STEM community and engage in Steering Committee.	ED, Office of Innovation & MSAP Project Director	Pre-award.
Notify local news outlets about STEM magnet grant and enrollment opportunities.	ED Communications, MSAP Project Director, Marketing Contractor	October 2017 and annually thereafter.
Create or revise written student recruitment plans for each magnet school with targets to promote diversity in STEM magnet schools.	ED, Office of Innovation; MSAP Project Director; ED, Student Service Center & Magnet School Principals	November 2017 and annually thereafter.
Create or review Enrollment Guide within Student Service Center to accept magnet school transfer applications from students and to hold lottery if necessary.	ED, Office of Innovation; MSAP Project Director; ED, Student Service Center	November 2017 and annually thereafter.

	& Magnet School Principals	
Design or revise a wide variety of marketing materials for STEM magnet schools in a variety of languages and including brochures, websites, fliers, posters, videos, billboards, advertisements and social media posts.	ED, Office of Innovation; MSAP Project Director; ED, Communications, Translation Department & Marketing Contractor	November 2017 and annually thereafter.
Implement targeted recruitment efforts and advertising for diverse enrollment in magnet schools. Prepare and send targeted mailing in conjunction with the open enrollment window opening January 1.	ED, Office of Innovation; MSAP Project Director; ED, Communications, Marketing Contractor & Magnet School Principals	November 2017 and annually thereafter.
Participate in annual district School Choice Fair.	ED, Office of Innovation; MSAP Project Director; ED, Communications, Marketing Contractor & Magnet School Principals	December 2017 and annually thereafter.
Conduct outreach at various community STEM activities and fairs.	MSAP Project Director; Marketing Contractor; STEM Specialist; STEM Instructional Coaches	October 2017 and quarterly thereafter.

Conduct school level assessment of each magnet school for welcoming atmosphere and magnet school theme in evidence.	MSAP Project Director; Marketing Contractor; STEM Specialist; STEM Instructional Coaches	October 2017 and annually thereafter.
Hold Open Houses at each STEM magnet school.	Magnet School Principals & Magnet School Instructional Councils	January 2018 and annually thereafter.
Accept STEM magnet school applications for out of attendance zone students through district transfer request process.	ED, Office of Innovation; MSAP Project Director; & ED, Student Service Center	January 2018 and annually thereafter.
Enroll students. Notify students and parents of STEM magnet school acceptance and mail letters.	ED, Office of Innovation; MSAP Project Director; & ED, Student Service Center	April 2018 and annually thereafter.
Hold student and parent orientation nights for STEM magnet schools.	MSAP Project Director; Magnet School Principals & Instructional Councils	May 2018 and annually thereafter.
Conduct training for magnet school staff on how to communicate school mission and vision to students and parents.	MSAP Project Director; Marketing Contractor; STEM Instructional Coaches; Magnet School Staff	December 2018 and annually thereafter.

Evaluate STEM magnet school enrollment, including percentage of new students recruited to school. Determine if school is on track to meet desegregation and enrollment targets. Make plan to continue recruitment over summer if necessary.	ED, Office of Innovation; MSAP Project Director; ED, Communications; Marketing Contractor & Magnet School Principals	May 2018 and annually thereafter.

***Objective 2 (Meeting Academic Standards)*:** All proposed magnet schools will provide challenging instruction aligned to Common Core state standards, such that all students have the opportunity to meet standards and achieve at the highest level.		
Project Activity	***Personnel Responsible***	***Time Frame***
Assess current curriculum and instructional units for alignment with standards and benchmarks. Create five-year timeline for the writing and review of new instructional units.	MSAP Project Director; STEM Specialist; STEM Instructional Coaches; Magnet School Staff.	December 2017 and ongoing.
Magnet Unit Development: Develop STEM curriculum writing and unit design rubric through initial professional development and ongoing coaching.	MSAP Project Director; STEM Specialist; STEM Instructional Coaches; Magnet School Staff.	January 2018 and ongoing.
Assess professional development needs at each school site. Plan and implement PD with Project Lead the Way and Buck	MSAP Project Director; STEM Specialist; STEM	December 2017 and ongoing.

Institute of Education trained professional developers for project-based learning.	Instructional Coaches; Magnet School Staff.	
Magnet Unit Implementation: Teachers develop and implement at least two STEM units.	MSAP Project Director; STEM Specialist; STEM Instructional Coaches; Instructional Council; Magnet School Staff.	January 2018 and annually thereafter.
Magnet Unit Quality Review: Review STEM units for quality.	MSAP Project Director; STEM Specialist; STEM Instructional Coaches; Instructional Council; Independent Evaluator; Magnet School Staff.	May 2018 and annually thereafter.

Objective 3 (Implementing Magnet Themes): All students, at each magnet school, will receive intensive, quality project-based STEM instruction.		
Project Activity	***Personnel Responsible***	***Time Frame***
Assess student exposure to STEM learning activities at each school.	MSAP Project Director; STEM Specialist; STEM Instructional Coaches, Magnet School Staff.	Pre-award.
Implement Project Lead the Way training.	MSAP Project Director; STEM Specialist; STEM	June 2018 and annually thereafter

	Instructional Coaches, Project Lead the Way Trainers; Magnet School Staff.	for first three years of grant.
Implement STEM specific classes at each school through Project Lead the Way.	MSAP Project Director; STEM Specialist; STEM Instructional Coaches; Magnet School Staff.	August 2018 and annually thereafter.
Integrate STEM learning objectives into non-STEM specific classes.	MSAP Project Director; STEM Specialist; STEM Instructional Coaches; Magnet School Staff.	August 2018 and annually thereafter.
Create and maintain STEM learning spaces within the school (ie, Makerspaces) to facilitate magnet school theme integration.	MSAP Project Director; STEM Specialist; STEM Instructional Coaches; Magnet School Staff.	August 2018 and ongoing.

Objective 4 (Strengthening Academic & Career Preparation): All students, at each magnet school, will demonstrate growth in the knowledge, skills and abilities relevant to the pursuit of post-secondary education and employment in STEM careers.		
Project Activity	***Personnel Responsible***	***Time Frame***

Implement project-based learning professional development for magnet school instructional staff.	MSAP Project Director; STEM Specialist; STEM Instructional Coaches; Project-Based Learning Contractors	January 2018 and annually thereafter.
Define STEM engineering challenges and develop rubrics to assessment student performance across grades and challenges.	MSAP Project Director; STEM Specialist; STEM Instructional Coaches; Magnet School Staff.	August 2018 and annually thereafter.
Implement project-based STEM engineering challenges.	MSAP Project Director; STEM Specialist; STEM Instructional Coaches; Magnet School Staff.	August 2018 and annually thereafter.
Make connections to STEM organizations, competitions and exhibitions (MESA, Roborave, First Robotics, Science Fair, Maker Fair).	MSAP Project Director; STEM Specialist; STEM Instructional Coaches	October 2017 and ongoing.
Develop opportunities for students to participate in STEM competitions and exhibitions.	MSAP Project Director; STEM Specialist; STEM Instructional Coaches; Magnet School Staff.	January 2018 and ongoing.

Objective 5 (Building Capacity): All teachers, school leaders and staff participating in the MSAP grant will receive high-quality professional development related to the improvement of curriculum and instruction and the integration of magnet theme development and integration.		
Project Activity	***Personnel Responsible***	***Time Frame***
Create and revise professional development plan to ensure a focus on culturally responsive teaching, design/engineering thinking and interdisciplinary STEM learning.	MSAP Project Director; STEM Specialist; STEM Instructional Coaches; Magnet School Staff.	December 2017 and annually thereafter.
Ensure each magnet school teacher receives 40 hours of STEM specific professional development through training, workshops and coaching, including a 5 day summer institute and 2 hours a month for Professional Learning Communities (PLCs).	MSAP Project Director; STEM Specialist; STEM Instructional Coaches; Magnet School Staff.	May 2018 and annually thereafter.
Create a plan for sustaining training, professional development and magnet school implementation after federal funding concludes.	ED, Office of Innovation; STEM Specialist, Magnet School Principals	June 2022

Objective 6 (Ensuing Equity & Access): Parental and community engagement in and satisfaction with project magnet schools will increase over the grant period.

Project Activity	*Personnel Responsible*	*Time Frame*
Survey students and parents at registration to identify reasons for choosing magnet school.	MSAP Project Director; Student Service Center; Independent Evaluator	August 2018 and annually.
Strengthen parent groups to align with the school mission and vision and to support the creation of a culturally responsive school.	MSAP Project Director; Associate Supt. Of Equity and Access; Magnet School Principals; Instructional Councils.	Ongoing.
Network with industry and university representatives to create linkages between K-12 education and post-secondary opportunities.	MSAP Project Director; STEM Specialist; STEM Instructional Coaches, Magnet School Principals; Magnet School Staff	Ongoing.

Responsibility for implementing the ***Engineering the Future*** project will be the responsibility of the Magnet Schools Assistance Program Project Director. This individual, who will be hired if the grant is funded, will work under the Executive Director of the Office of Innovation. The Director will design, implement and report on the federal MSAP grant, including serving as the main point of contact for the U.S. Department of Education MSAP Office. The Director also will work directly with the Independent Evaluator to collect data and assess progress towards project goals. He or she will liaison with district leadership, magnet school principals, the APS Grants Management Department, the district's internal data collection and research department and other stakeholders necessary for the implementation of the grant,

including STEM partners and the Albuquerque Teachers Federation. The Director will protect the STEM magnet school vision, and will work with key constituents to communicate the vision and enlist supporters. The Director will stay informed on relevant research, theory and best practices in order to ensure the project stays relevant and continues to evolve. Finally, the Director will work closely with the marketing and recruitment specialists to ensure that the project does not fail due to lack of proper communication strategies. In addition to the project activities aligned to objectives as described above, the ***Engineering the Future*** project has created the timeline below to describe the project activities, personnel and timeframes related to the overall management of the project.

Adequacy of the Management Plan		
Project Activity	***Personnel Responsible***	***Time Frame***
Hire MSAP Project Director	ED, Office of Innovation; Assoc. Supt. Equity & Access	October 2017
Hire STEM Specialist, STEM Instructional Coaches and High School Principal/Secretary	ED, Office of Innovation; Assoc. Supt. Equity & Access; Area Supt.; MSAP Project Director	October – November 2017
Convene Magnet School STEM Steering Committee to review mission and vision. Create a calendar of meetings.	ED, Office of Innovation; Assoc. Supt. Equity & Access; Area Supt.; MSAP Project Director	October 2017
Establish MSAP budget and review with each magnet school.	ED, Office of Innovation; MSAP Project Director;	October 2017 and monthly thereafter.

	Director, Grants Management; Magnet School Principals	
Meet with Independent Evaluator to review actions needed for project evaluation.	ED, Office of Innovation; MSAP Project Director; Independent Evaluator; STEM Specialist	October 2017 and monthly thereafter.
Sign Memorandums of Understanding with project partners.	ED, Office of Innovation; MSAP Director; STEM Specialist	October 2017 and ongoing.
Review progress towards MSAP project objectives monthly through the ***Engineering the Future*** Leadership Council.	ED, Office of Innovation; MSAP Director; STEM Specialist; STEM Instructional Coaches	October 2017 and ongoing.
Review school site progress towards MSAP project objectives monthly through each school's Instructional Council.	ED, Office of Innovation; MSAP Director; STEM Specialist; STEM Instructional Coaches; Magnet School Principals; Instructional Council Members	October 2017 and ongoing.

(2) How the applicant will ensure that a diversity of perspectives are brought to bear in the operation of the proposed project, including those of parents, teachers, the business

community, a variety of disciplinary and professional fields, recipients or beneficiaries of services, or others, as appropriate.

In order to ensure that diverse perspectives are brought to bear throughout the ***Engineering the Future*** project, project leadership will establish a Magnet School STEM Steering Committee, as described earlier in this proposal. The Magnet School STEM Steering Committee will include, from each school, the principal, a teacher representative and the STEM Instructional Coach. In addition, the Magnet School STEM Steering Committee will include the Superintendent, other district leadership, a representative from the Department of Curriculum and Instruction, the independent evaluator, and other individuals determined by the committee. Finally, from outside of the K-12 educational pathway, the Magnet School STEM Steering Committee will include diverse representatives from the STEM industry, the University of New Mexico, the City of Albuquerque's Office of Economic Development, museums and the large community formed to support STEM educational efforts. The role of the Magnet School STEM Steering Committee will be to offer support, serve as ambassadors of the project and offer suggestions for improvement, if necessary. This group will serve as a crucial sounding board for the project and will provide the diversity of perspectives needed to guide the project successfully.

(d) Quality of Personnel (5 points) (34 CFR 280.31)

(1) The Secretary determines the extent to which—

(a) The project director (if one is used) is qualified to manage the project,

<u>MSAP Project Director (MSAP-Funded)</u>

Qualifications of the MSAP Project Director: Albuquerque Public Schools plans to hire a full-time Project Director to manage the ***Engineering the Future*** project, should its application to the Magnet Schools Assistance Program be successful. The qualifications for the MSAP

Project Director position have been established to make certain that the person hired to hold this crucial position has the skills, experience and attributes necessary to provide effective leadership to the project and ensure its success. The MSAP Project Director will have the following qualifications:

(1) State licensure in an educational field (School Administrator licensure preferred);

(2) Degree in education or a related field (Master's Degree preferred);

(3) At least three years of experience as a district or school-level supervisor or administrator responsible for project management;

(4) Experience with grant management;

(5) Experience in professional development and adult learning;

(6) The capacity to implement systemic reform and cultural transformation;

(7) The ability to work successfully with students and parents of different races, ethnicities and social and economic backgrounds;

(8) Knowledge of New Mexico State Standards and Benchmarks;

(9) The ability to build collaborative relationships with a wide variety of stakeholders, including community-based organizations, cultural institutions, institutions of higher learning and businesses;

(10) Demonstrated leadership in the development of successful schools and/or programs;

(11) Demonstrated leadership ability; and

(12) Excellent interpersonal communication skills.

Duties and Responsibilities of the MSAP Project Director*:** The MSAP Project Director is responsible all aspects of the planning and successful implementation of the ***Engineering the Future project. This includes:

(1) Working closely with district leadership and magnet school principals to ensure the ***Engineering the Future*** project successfully meets its goals and objectives;

(2) Coordinating resources devoted to outreach and recruitment activities and ensuring that these activities always remain focused on ensuring ethnic, racial and socioeconomic diversity;

(3) Supervising the STEM Instructional Coaches assigned to work with each school;

(4) Assisting the each magnet school's Principal and Instructional Council in implementing its magnet school program; including:

   a. Infusing STEM instructional strategies into each school's curriculum;

   b. Ensuring curriculum is aligned with New Mexico State Standards and Benchmarks;

   c. Adopting culturally and socio-economically responsive teaching strategies;

   d. Designing and implementing high-quality, relevant professional development for instructional staff; and

   e. Supporting systemic reforms capable of transforming the culture and climate of the school.

(5) Maintaining and communicating the vision of the ***Engineering the Future*** project to a wide variety of community partners and stakeholders in order to enlist community support;

(6) Ensuring that all aspects of the ***Engineering the Future*** project are informed by input from parents and community stakeholders;

(7) Serving as the point of contact for all communications with the U.S. Department of Education and Magnet Schools Assistance Program staff;

(8) Working closely with the Albuquerque Public Schools Grants Management Department to manage all budgetary aspects of the project;

(9) Working closely with the independent evaluator to collect all necessary data to complete the requisite program evaluation; and

(10) Ensuring the ***Engineering the Future*** project is sustainable after the conclusion of federal funding.

Due to the crucial nature of all of these duties and responsibilities, the role of the MSAP Project Director will be central to its success. Albuquerque Public Schools will fill this position in accordance with all district policies and procedures in order to find an individual with the qualifications described in this proposal.

(b) Other key personnel are qualified to manage the project; and

Other key personnel, both MSAP-funded and non-MSAP funded, have the qualifications and experience to manage the ***Engineering the Future*** project successfully.

Executive Director of the Office of Innovation (Non-MSAP-Funded)

Executive Director of the Office of Innovation: The MSAP Project Director will report to Deborah Elder, Executive Director of Innovation in Albuquerque Public Schools. Ms. Elder oversees the Office of Innovation and is responsible for the development of new programs and schools of choice within the district. She brings to the Office of Innovation a commitment to craft personalized learning experiences for students, overcome obstacles to achieve a new vision of education, and create an innovative approach to rigorous learning for all students. In addition to designing, developing and implementing new programs and schools of choice, Ms. Elder collaborates with the APS Charter Schools Office, which supports over 20 district-authorized charter schools in Albuquerque. Together, the Office of Innovation and the Charter Schools

Office are building a portfolio strategy to support the creation and implementation of a wide array of unique schools within Albuquerque to meet the needs of diverse learners.

Ms. Elder spent seven years as principal of Zuni Elementary Magnet School, a nationally recognized APS magnet school for technology and communication. Previous to her work at Zuni Elementary, she served at E.G. Ross Elementary as assistant principal, and began her career in APS as a teacher at Carlos Rey Elementary School in 1993. She spent three years in the APS Research, Development and Accountability Department where she helped schools use data to evaluate programs, interpret assessments and guide professional development with a goal of improving student achievement.

Ms. Elder has shared her expertise in multiple national venues, from presentations at the Learning Forward Annual Conference to designing and implementing professional development for principals at the Discovery Education Principal's Symposium around transforming school culture for digital age learning. She received the Southwest Branch of the International Dyslexia Association's Leadership in Literacy Award in 2009, and Zuni received recognition in 2011 for its commitment to parent and community involvement from Leadership Albuquerque. Ms. Elder also received a week of training from the University of Virginia's Turnaround Program, the only program in the country dedicated to establishing the school system conditions that set the stage for change and to building transformative leadership capacity to achieve that change. In New Mexico, she serves as a mentor in the New Mexico Public Education Department's Principals Pursuing Excellence Program, a statewide turnaround effort.

As a part of her role in the ***Engineering the Future*** project, Ms. Elder will supervise the MSAP Project Director and align district leadership and magnet school principals to ensure the ***Engineering the Future*** project successfully meets its goals and objectives. Much of her role will include communicating the vision of the ***Engineering the Future*** project to a wide variety

of community partners and stakeholders, enlisting community support and demonstrating how the project fits into the master academic plan of Albuquerque Public Schools. Ms. Elder also will work with the Superintendent and the Board of Education to develop policy and procedure to will actualize the district's magnet school goals. Through formalizing these structures, Ms. Elder will create a supportive framework to sustain magnet schools within Albuquerque Public Schools after federal funding has ended.

Associate Superintendent of Equity and Access (Non-MSAP-Funded)

Associate Superintendent of Equity and Access: The Office of Innovation at Albuquerque Public Schools is part of the portfolio of the Associate Superintendent of Equity and Access, Katarina Sandoval. Ms. Sandoval began working for APS in January 2014 as the Executive Director of Innovation, a newly created position in the district charged with creating schools and programs to create pathways of choice for families. Previously, Ms. Sandoval co-founded South Valley Academy in 1999, an APS-authorized charter school that prepares all students to enter college. She served as Principal at South Valley Academy before transitioning to APS. Ms. Sandoval is a graduate of Albuquerque's West Mesa High School, and earned her bachelor's degree from Stanford University and her master's degree in Teaching and Curriculum from Harvard University. She began her teaching career in Boston Public Schools and has been an educator since 1995.

In her role as the Associate Superintendent of Equity and Access, Ms. Sandoval is responsible for creating the vision for this newly created office that implements the district goal of developing the whole child, which ensures that each student is engaged, challenged, and supported through programs and practices focused on removing social, emotional, and physical barriers to learning. To date, she has been instrumental in creating the opportunity for students to take ethnic studies classes at each of the district's high schools and in bringing a National

Institutes of Justice grant to the district to investigate the use of restorative justice practices at the middle school level to reduce the disparate impact of suspensions and expulsions on minority youth. Ms. Sandoval works with a number of community groups and initiatives focused on addressing issues of equity within the district, including My Brother's Keeper. My Brother's Keeper is a call to action for cities, tribal nations, towns, and counties to build and execute robust plans to ensure that all young people—no matter who they are, where they come from, or the circumstances into which they are born—can achieve their full potential.

STEM Specialist (MSAP-Funded)

STEM Specialist*:* Albuquerque Public Schools will hire a STEM Specialist to support professional development efforts and the development of a K-12 STEM learning continuum, if the ***Engineering the Future*** project is funded. The role of the STEM Specialist will be to work across all three magnet schools included in the grant proposal to facilitate linkages across grade levels and subject areas. The STEM Specialist will have a deep knowledge based in STEM concepts and practices, as well as experience in professional development, project-based learning and curriculum development.

Qualifications of the STEM Specialist: Albuquerque Public Schools will fill the STEM Specialist position in accordance with all district policies and procedures. District leadership with experience in STEM will be asked to identify potential candidates with the requisite subject-area and professional development experience. The STEM Specialist will be required to have the following qualifications:

(1) At least five years of experience of STEM-based curriculum and professional development at the school and district level;

(2) New Mexico licensure as an educator or administrator, or the ability to secure such licensure;

(3) A BA or BS degree or higher, with preference for degrees in a STEM field;

(4) Demonstrated ability to work with students and families from diverse ethnic, racial and socioeconomic backgrounds;

(5) Knowledge of cultural and socioeconomically responsive and relevant instructional strategies and their implementation;

(6) Knowledge of project-based learning strategies and their implementation;

(7) Demonstrated ability to work with adult learners to implement strategic whole school reform strategies;

(8) Knowledge of STEM content, practices and applications and their alignment with state standards and benchmarks; and

(9) Experience building collaborations between schools, community-based organizations, cultural institutions, institutions of higher education and businesses to align K-12 education to career pathways.

Duties and Responsibilities of the STEM Specialist: The STEM Specialist will report directly to the MSAP Project Director and will work with all three magnet schools included in the ***Engineering the Future*** project. The STEM Specialist will work closely with the STEM Instructional Coaches to be hired at each school, the principal of each magnet school, its Instructional Council, its Professional Learning Communities (PLCs) and the project's professional development (PD) providers. The STEM Specialist will ensure that New Mexico State Standards and Benchmarks are fully integrated into the curricular units at each school and that the learning goals and objectives are articulated and aligned across the K-12 STEM pathway. The duties and responsibilities of the STEM Specialist will include:

(1) Facilitating the development of a K-12 integrated STEM curriculum, magnet theme objectives and project-based learning experiences;

(2) Leading efforts to network teachers across schools and grades, ensuring shared learning and the maximum impact of professional development efforts;

(3) Supporting the efforts of the STEM Instructional Coaches at each school site;

(4) Focusing on the articulation and alignment of STEM instructional units as they are created, and supporting instructional staff in the quality review of these units;

(5) Ensuring vertical articulation of STEM learning goals and objectives to create a K-12 STEM pathway; and

(6) Serving as a member of the overall project Magnet School STEM Steering Committee.

(7) Serving as a liaison between project magnet schools and district ***Engineering the Future*** leadership.

STEM Instructional Coaches (MSAP-Funded)

STEM Instructional Coaches (MSAP-Funded): Albuquerque Public Schools will hire a STEM Instructional Coach for each project magnet school if the ***Engineering the Future*** project is funded. These individuals will be critical, on-the-ground engineers of school transformation.

Qualifications of the STEM Instructional Coaches: Albuquerque Public Schools will fill the STEM Instructional Coaches positions in accordance with all district policies and procedures. District leadership with experience in STEM will be asked to identify potential candidates with the requisite subject-area and professional development experience. The STEM Instructional Coaches will be required to have the following qualifications:

(1) At least three years of experience of STEM-based curriculum and professional development at the school and district level;

(2) New Mexico licensure as an educator or administrator, or the ability to secure such licensure;

(3) A BA or BS degree or higher, with preference for degrees in a STEM field;

(4) Demonstrated ability to work with students and families from diverse ethnic, racial and socioeconomic backgrounds;

(5) Knowledge of cultural and socioeconomically responsive and relevant instructional strategies and their implementation;

(6) Knowledge of project-based learning strategies and their implementation;

(7) Demonstrated ability to work with adult learners to implement strategic whole school reform strategies;

(8) Knowledge of STEM content, practices and applications and their alignment with state standards and benchmarks; and

(9) Experience building collaborations between schools, community-based organizations, cultural institutions, institutions of higher education and businesses to align K-12 education to career pathways.

Duties and Responsibilities of the STEM Instructional Coaches: The STEM Instructional Coaches will report directly to the MSAP Project Director and will work at the project magnet schools as resource teachers. The STEM Instructional Coaches will work closely with the principal of each magnet school, its Instructional Council, its Professional Learning Communities (PLCs) and the project's professional development (PD) providers. The STEM Instructional Coaches will ensure that STEM activities and learning concepts are fully integrated into the instructional programs of each magnet school. The duties and responsibilities of the STEM Instructional Coaches will include:

(1) Serving as resources for Magnet School Principals, Instructional Councils and Professional Learning Communities at each magnet school related to project-based learning and incorporating STEM into thematic instruction;

(2) Working with Magnet School Principals, Instructional Councils and Professional Learning Communities to develop and align magnet schools curricula and instructional units, professional development programs and magnet theme-related instructional programs to meet New Mexico State Standards and Benchmarks;

(3) Working with Magnet School Principals, Instructional Councils and Professional Learning Communities to establish schedules and goals for professional development for each magnet school;

(4) Participating in all professional development workshops and activities;

(5) Providing coaching and support to instructional staff as they implement new curricula, units of study and instructional methods in the classroom;

(6) Working with Magnet School Principals, Instructional Councils and Professional Learning Communities to implement programs with proven evidence of success that further standards-based STEM instruction;

(7) Assisting Magnet School Principals, Instructional Councils and Professional Learning Communities with undertaking the systemic reforms (use of space, use of personnel, use of resources, use of time) necessary to fully integrate the STEM theme into the school culture and practices;

(8) Working with Magnet School Principals, Instructional Councils, Professional Learning Communities and the Independent Evaluator to collect the data necessary to ensuring that the ***Engineering the Future*** project is able to be successfully evaluated; and

(9) Serving as a liaison between project magnet schools and district ***Engineering the Future*** leadership.

Magnet School Principals (Non-MSAP-Funded & Partially-MSAP-Funded)

The principal of each magnet school will be essential to the implementation and overall success of the ***Engineering the Future*** project. Each principal has been, or will be, selected to participate in this project because of his or her belief in the vision of this project and ability to provide effective instructional leadership. Principals are responsible for all aspects of the school's operation, but their role as the chief leaders of culture and community is often overlooked. As described in the proposal, all of the principals who will take part in the ***Engineering the Future*** project have proven track records as leaders of academic reform and extensive experience in diverse communities.

Mission STEM Elementary School Principal (Non-MSAP-Funded): Frances Garcia has served as the Principal of Mission Elementary School since 2012. Previously, she was the Dean of Students/Small Learning Communities at Valley High School between 2008 and 2012. In addition to this leadership experience, Ms. Garcia has served as an Educational Assistant, a Special Education Teacher and an Instructional Coach. Ms. Garcia has extensive experience in high-poverty elementary, middle and high schools and will bring a necessary focus on the needs of students with disabilities to the ***Engineering the Future*** project. Since coming to Mission Elementary School, Ms. Garcia has led her team to advance the integration of technology into instruction and has completed Apple Vanguard training. Ms. Garcia is committed to professional development and learning with teachers as they accelerate the integration of technology and STEM principles into instruction.

Garfield STEM Middle School Principal David Lynch (Non-MSAP-Funded): David Lynch has served as the Principal of Garfield Middle School since 2010. In 2014, Garfield became one of Albuquerque's first STEM magnet middle schools. Since its transformation into a STEM magnet middle school, Mr. Lynch has successfully increased the school's enrollment against a background of declining district enrollment. He has led teachers in increasing academic

expectations for students and recruited high-quality staff members with STEM expertise. One of these staff members has built an award-winning robotics team, which qualified for national competition in 2016. Mr. Lynch has eleven years of experience as a middle school administrator, all in high-poverty and majority minority schools in Albuquerque Public Schools. Previous to his administrative experience, he served as a middle and high school Social Studies and Spanish teacher. Mr. Lynch holds a B.A. in Spanish and History from Hiram College and a M.A. in Education Supervision and Administration from Seton Hall University. His work as Principal of Garfield STEM Middle School has laid the foundation for the creation of the K-12 STEM Pathway, which is the goal of the ***Engineering the Future*** project.

North Valley STEM Academy Principal (Partially-MSAP-Funded): If funded, the ***Engineering the Future*** project will hire a qualified school administrator to serve as the Principal of the newly formed North Valley STEM Academy. Albuquerque Public Schools will fill the North Valley STEM Academy Principal position in accordance with all district policies and procedures. The North Valley STEM Academy Principal will be required to have the following qualifications:

(1) New Mexico licensure as an administrator, or the ability to secure such licensure;

(2) A MA or MS degree or higher, with preference for degrees in a STEM field;

(3) Demonstrated ability to work with students and families from diverse ethnic, racial and socioeconomic backgrounds;

(4) Demonstrated ability to lead instructional staff to implement highly effective instructional practices;

(5) Demonstrated ability to use data to analyze student performance and generate school improvement;

(6) Demonstrated ability to create a positive and supportive school culture through building relationships and maintaining communication;

(7) Knowledge of STEM content, practices and applications and their alignment with state standards and benchmarks;

(8) Experience building collaborations between schools, community-based organizations, cultural institutions, institutions of higher education and businesses to align K-12 education to career pathways; and

(9) Demonstrated ability to communicate the mission and vision of the magnet school to diverse communities.

Engineering the Future Project Evaluator (MSAP-Funded)

In order to ensure that the ***Engineering the Future*** project can be evaluated both for internal program improvement purposes and to generate meaningful research for the field, Albuquerque Public Schools has engaged Pivot Evaluation as the project evaluator should the proposal be funded. Pivot Evaluation is led by Dr. Curtis J. Mearns, a practitioner with over 25 years of experience in the fields of education, public health, and suicide prevention. He has experience in a variety of federal projects including the US Fish and Wildlife Service, US Forest Service, National Science Foundation, and the Substance Abuse and Mental Health Administration. Dr. Mearns earned his Doctorate in 1997 from the University of Nevada Reno in Experimental Psychology with an emphasis in program evaluation. Please see the project evaluation portion of the application for more information on his skills and experience.

Engineering the Future Marketing Contractor (MSAP-Funded):

In order to ensure that the ***Engineering the Future*** project meets its goal of recruiting a diverse student body to enroll in the K-12 magnet school pathway, Albuquerque Public Schools acknowledges the importance of engaging an outside contractor with specialized expertise in

marketing, advertising and design. The Marketing Contractor, to be selected in accordance with all district policies and procedures related to procurement, will be responsible for working with each magnet school to help develop images and language to communicate its unique mission. Following this step, the Marketing Contractor will and for design a wide variety of materials (logos, billboards, brochures, fliers, posters, postcards, advertisements, social media content, radio PSAs, websites, letterhead, presentations, etc.) to reflect that mission. In particular, the Marketing Contractor will assist each school in creating a marketing and recruitment plan which blends a mix of face-to-face and mass communication strategies (radio, social media, billboards, purchased advertisements) for driving enrollment. As needed, the Marketing Contractor will assist each magnet school in redesigning marquees, school signage and other aspects of each facility to reflect the integration of the magnet theme.

Resumes for all key personnel and relevant job descriptions are included in the appendix.

(c) Teachers who will provide instruction in participating magnet schools are qualified to implement the special curriculum of the magnet schools.

Albuquerque Public Schools strives to hire teachers with the highest qualifications to implement instruction in all schools and follows State of New Mexico regulations regarding the hiring of licensed teachers, as required by the Every Student Succeeds Act (ESSA). Per New Mexico regulations, all licensed teachers need a bachelor's degree or higher with at least 30 hours in their endorsement area, passing scores on the National Evaluation Series (NES) and an approved background check. Teachers can obtain licensure in New Mexico through reciprocity with other states, an approved teacher education program, an approved alterative licensure program, a portfolio review or through the NM-TEACH evaluation process. The State of New Mexico also provides endorsements as a demonstration of subject matter competence for each core subject a teacher will teach.

Opportunities to teach at an ***Engineering the Future*** project magnet school will be open to all credentialed and certified teachers who have the required grade level license and an interest in the magnet theme. Teachers who interview for a position at one of the project magnet schools will receive information about the specific job description and expectations for joining the staff at a magnet school. These expectations and duties are developed by the magnet school principal in consultation with the school's Instructional Council. After reviewing the specific expectations at a magnet school, teachers and instructional staff interested in working within this framework are asked to sign a Commitment Letter acknowledging the specific magnet theme of the school and agreeing to take part in its implementation. The Albuquerque Teachers Federation (ATF), which represents teachers in Albuquerque Public Schools, has approved a Commitment Letter as a part of the application process at magnet schools and as an addendum to the standard teaching contract in the district. This process allows for full transparency for both teachers applying to work at a magnet school and for the existing staff and leadership of the school. It also helps to ensure that teachers at magnet schools have fully endorsed its theme and are fully committed to its implementation.

(2) To determine personnel qualifications, the Secretary considers experience and training in fields related to the objectives of the project, including the key personnel's knowledge of and experience in curriculum development.

As demonstrated by the descriptions of their experience presented earlier, Deborah Elder, the Executive Director of the Office of Innovation, and Katarina Sandoval, the Associate Superintendent of Equity and Access, have extensive expertise in curriculum development and working to increase equity for all students, especially English Language Learners. Through her work with existing magnet schools in the district, Ms. Elder has collaborated with a wide variety of professional development providers and has extensive experience in revamping curriculum to

improve academic achievement and promote diversity. A particular focus in her work has been the development of interdisciplinary curriculum materials and activities that cut across content areas to enhance and enrich student learning. To date, she has revamped the district's magnet school framework in order to strengthen the application of Magnet School of America principles in existing district magnet schools and has built a strong framework upon which to base the growth of new magnet schools, as described in this proposal.

Under the Office of Innovation and Ms. Elder's leadership, the ***Engineering the Future*** project will use a backwards planning/Understanding by Design approach to curriculum development. Curriculum development will begin with what students are expected to know and be able to do at each grade level. Using New Mexico State Standards and Benchmarks, Next Generation Science Standards and the Gold Components of Project-Based Learning from the Buck Institute of Education, instructional staff will define the intended outcomes of instruction. From this ultimate goal, instructional staff will collaborate, with the support of the resources described in this grant proposal, to build a year-long curriculum that will achieve those outcomes and create consistency of expectation from classroom to classroom and from year to year. Ms. Elder has had extensive experience with and training in these Understanding by Design principles of curriculum development and successfully implemented them during her tenure at Zuni Elementary School, bringing the school's state-issued grade from a D to an A in three years.

(e) Quality of Project Evaluation (20 points) (34 CFR 75.210).

The Secretary considers the quality of the evaluation to be conducted of the proposed project.

Dr. Curtis J. Mearns has practiced program evaluation for over 25 years in the field of education, public health, and suicide prevention. He has experience in a variety of federal projects including the US Fish and Wildlife Service, US Forest Service, National Science

Foundation, and the Substance Abuse and Mental Health Administration. Dr. Mearns earned his Doctorate in 1997 from the University of Nevada Reno in Experimental Psychology with an emphasis in program evaluation.

Beginning in 1996, Dr. Mearns worked with one of the largest school districts in the nation. At the end of his tenure, nearly 60% of his work was public health in nature. While working with the school district, he conducted a large-scale quasi-experimental design using matched students from experimental and comparison schools. In 2006, he brought his significant methodological skills to bear on several community and state-level programs in New Mexico, including a multi-year state-level 21st Century Community Learning Center evaluation where he developed a growth model to determine program effects after student program participation at approximately 25 sites. Utilizing a participatory approach and providing results that drive client decision-making, Dr. Mearns currently participates on a team of evaluators studying the Law Enforcement Assisted Diversion program in Santa Fe, New Mexico, which uses a harm reduction approach with non-violent opioid users. He has experience with reporting in various federal NOM and GPRA reporting systems.

Dr. Mearns has coordinated both large-scale and small-scale evaluations with as many as 125 sites. He uses experimental and quasi-experimental methods in conjunction with mixed methods to validate results. He also selects unobtrusive measures when available to save money for the client and to validate results from more traditional methods. He uses a variety of statistical methods and learns new methods as the context arises. Dr. Mearns highly values field experience and prefers to inform results interpretation through participant and program staff interactions. For example, after a longitudinal study of educational data associated with supplementary services provided to students in the local school district, a presentation to program staff clarified program design goals and produced a new interpretation of processes

required for graduation. Because of his participatory approach to program evaluation, he engages stakeholders in a way that allows for honest sharing and discussion that, in turn, provides valuable information for decision makers.

Dr. Mearns has observed the What Works Clearinghouse (WWC) since its inception and attended WWC presentations at conference sessions. He is well informed as to the shifting methodological requirements of the WWC and plans to attend an IES workshop this summer on improving quasi-experimental designs at Northwestern University.

(1) The extent to which the methods of evaluation will, if well implemented, produce evidence of promise (as defined in this notice).

The Magnet Schools Assistance Program notice refers to "evidence of promise" as meeting What Works Clearing House requirements for quasi-experimental design with reservations.

Study Design: Evaluators propose a Quasi Experimental 2 non-equivalent group pre-test post-test design (Shadish, Cook, Campbell, 2002). Because of the *a priori* nature of the groups, this study will monitor several variables to determine equivalence. Those variables include free and reduced price meals participation, parental education level, and parental occupation. Because magnet schools essentially "market" a different service than standard schools, other potential self-selection variables may be at play. A registration survey will attempt to identify other potential variables such as a bias toward science curriculum or a preference for a project based learning instruction, for example.

Sample Attrition: APS tracks attrition regularly, and this study in particular will monitor attrition. APS maintains historical enrollment records and can produce historical attrition records for each school in the study (treatment and comparison) prior to project implementation and throughout the project. Evaluators will establish baseline attrition rates and use overall and

differential attrition rates to determine study validity. Additionally, comparing attrition rates among treatment groups (magnet and comparison) will meet required WWC metrics for study quality.

Baseline Equivalence: Additionally, the study uses two comparison groups that potentially identify different confounds. The first regression developed comparison adjusts for neighborhood effects the way most education control groups work. The second develops a geographic control by establishing geographically concentrated populations taking advantage of the magnet opportunity. For example, if the majority of students taking advantage of the magnet school come from three schools, then those three schools should serve as a control. The two comparison groups could be the same schools, but because of the self-selection process may not be. Additionally, evaluators will annually implement a registration survey designed to identify variables associated with self-selection biases. If differences in baseline characteristics are shown to be within the range that requires statistical adjustment, this study will employ regression adjustment or analysis of covariance (ANCOVA). Evaluators will establish equivalence separately for each outcome domain (e.g. reading, math, etc.).

Outcome Eligibility and Reporting: Each suggested variable will meet face validity and reliability standards, except race/ethnicity, an un-validated, self-reported construct designed by the U.S. Census. Outcome variables are not over aligned with the intervention and are collected using the same methods in the magnet schools and comparison schools. The evaluator has the skills and capacity to comply with WWC reporting requirements.

Confounding Factors: This study has the potential for confounding factors due to the non-random assignment (*a priori* groups) to conditions. To combat such a potential, the study employs two comparison groups drawn using different theories. The two control groups will look the same if there are no confounding variables. Besides inspecting traditional educational

variables (SES, parental education and occupation), this study will actively collect additional variables using an annual registration survey that asks about prior parental educational experiences, behavior management (safety) concerns, and topical experience relative to the magnet school. Because magnet schools rely on market forces, evaluators need to determine what contributes to selecting a magnet school over a neighborhood school. Evaluators will design the registration survey to elicit potential selection-bias variables.

(2) The extent to which the methods of evaluation include the use of objective performance measures that are clearly related to the intended outcomes of the project and will produce quantitative and qualitative data to the extent possible.

Albuquerque Public Schools aligned the ***Engineering the Future*** project with the six purposes of the Magnet Schools Assistance Program (MSAP) and the logic model included with this proposal. APS also developed a set of objectives and performance measures linked to the resources, project activities and outputs included in the logic model. This section outlines the specific project outputs used to determine if the project is on track to meet its objectives and the specific methods used to collect data to determine if the project activities are in line with project outputs.

Engineering the Future Project Outputs

Table 10 shows the measures used to address outputs as they potentially impact implementation quality. Evaluators will use these results to generate conversation among ***Engineering the Future*** program staff regarding program performance and improvement.

Table 10: ***Output Matrix of Measures***	
Outputs	**Indicator/Measure**

Recruitment plan designed to meet enrollment targets: ●Print, video and web materials produced in multiple languages exist. ●N people attend open houses, community events & other outreach held. ●N families use accessible application process. ●Advertising placed in strategic outlets.	Catalog of approved and released materials. Sign-in sheets or counts. N transfer applications filed. Catalog of advertising venues & expected audience counts.
●Cross-curricular units of study aligned to state standards exist. ●Evidence of EF staff curricular review and upgrade exists. ●Implemented fidelity (80% or better) in 90% of classrooms.	N units developed that demonstrate alignment. N meetings & output documents. Fidelity measures (w/inter-observer agreement) on sample of classrooms.
Systemic reform of school practices includes: ●N staff participating in specific PD related to integration of STEM magnet school theme.	Agendas and sign-in sheets.

STEM learning opportunities increase: ●N project-based STEM engineering challenges developed. ●Rubric and expectations for success on project-based STEM engineering challenges exists. ●N connections to STEM learning challenges sponsored by organizations.	Log of project-based learning (PBL) challenges w/quality indicator (PBL rubric). PBL rubric exists & meets inter-observer agreement criteria. Catalog of partners with completed contributions.
N teachers received at least 40 hours of high quality, STEM relevant professional development in each year of the grant.	Completion logs w/ participating hours.
● N parent engagement including workshops, phone calls, emails, open houses, exhibitions, and tours held.	Catalog of completed events w/ participation counts.

Student climate remains a key indicator of successful education settings (Popham, 2005). This study will make use of a locally developed and factor analysis tested climate instrument designed to benchmark student engagement, self-efficacy, and peer academic pressure over time and compared to other schools. Additionally, this study will monitor gender differences in all outcomes and behavior management via major office discipline referrals. Unanticipated outcomes in either of these domains would require program adjustment.

Engineering the Future Project Performance Measures & Outcomes

A primary goal of the ***Engineering the Future*** project is to bring improved educational opportunities to schools with predominantly low SES enrollment. This will attract students from

higher SES neighborhoods. Therefore, the evaluation will monitor both student enrollment changes over time as well as teacher experience and qualifications. The evaluation will monitor attrition from both magnet school sites and comparison schools. Additionally, the evaluation will compare enrollment and teacher experience to each of the two comparison groups.

Performance Measure 1.1: Minority group isolation of Hispanic students will decrease over the grant period for each magnet school as indicated in the table below.

Table 11: Reduction in Hispanic Minority Group Isolation

	16-17	***Year 1***	***Year 2***	***Year 3***	***Year 4***	***Year 5***
Mission STEM Magnet Elementary	60.93%	60.90%	59.95%	58.76%	57.91%	56.57%
Garfield STEM Magnet Middle School	84.59%	82.52%	81.4%	81.05%	79.24%	78%
North Valley STEM Magnet Academy	N/A	N/A	84.55%	82.79%	81.90%	80%

Performance Measure 1.2: The proportion of low-income students will decrease over the grant period for each magnet school as indicated in the table below.

Table 12: Reduction in Low-SES Students

	16-17	***Year 1***	***Year 2***	***Year 3***	***Year 4***	***Year 5***
Mission STEM Magnet Elementary	100%	100%	99%	97%	94%	90%
Garfield STEM Magnet Middle School	100%	100%	99%	97%	94%	90%

North Valley STEM Magnet Academy	N/A	N/A	75%	72%	69%	65%

Performance Measure 1.3: Student enrollment of each magnet school will increase as indicated in the table below.

Table 13: Increased Student Enrollment

	16-17	***Year 1***	***Year 2***	***Year 3***	***Year 4***	***Year 5***
Mission STEM Magnet Elementary	366	374	382	388	392	396
Garfield STEM Magnet Middle School	370	412	427	438	448	450
North Valley STEM Magnet Academy	N/A	0	110	215	315	410

Performance Measure 1.4: The rate of student applications for transfer into each magnet school from outside its attendance zone will increase by at least 10% each year.

Data Sources for Objective 1**:** Albuquerque Public Schools staff draws enrollment data from its Student Information System (SIS) on the 40th day (approximately Oct. 1) following state and federal reporting requirements. SIS staff will disaggregate results by ethnicity and socioeconomic status to report on ***Performance Measures 1.1 and 1.2***. Staff will use magnet school application data to determine the extent to which the schools are successfully increasing enrollment and attracting students from outside of their traditional attendance boundaries (***Performance Measures 1.3 and 1.4)***.

Performance Measure 2.1: The number of cross-curricular units of study aligned with state learning standards will increase by 10% annually over the baseline year. Project staff at each school along with the assistance of the STEM Specialist and STEM Instructional Coaches will develop rubrics to assess lesson unit quality. Reviews will occur quarterly or as determined by school Instructional Councils. As this is a peer review process, teachers will review and score each other's units. Evaluators will monitor inter-observer agreement and revise the rubrics to gain reliable results.

Performance Measure 2.2**:** New Mexico's annual state assessment is the Partnership for Assessment of Readiness for College and Careers (PARCC). This project proposes to use reading and math outcome measures for the longitudinal study of annual testing results. Evaluators will develop a longitudinal growth model to test treatment schools against comparison schools. Evaluators will conduct a number of statistical comparisons; however, the critical test will analyze narrowing of the achievement gap among the minority students and low SES students.

Data Sources for Objective 2**:** Site developed project based learning (PBL) implementation rubrics will provide data for ***Performance Measure 2.1,*** while PARCC will provide data for Reading and Math student performance (***Performance Measure 2.2***).

Performance Measure 3.1**:** The number of project based learning activities in each magnet school that integrate STEM into curriculum, lesson plans and instruction will increase over the baseline year by 5 percent each year.

Performance Measure 3.2**:** The percentage of teachers in each magnet school who demonstrate additional STEM content knowledge and confidence in teaching STEM subjects will increase over the baseline year by 5 percent each year.

Data Sources for Objective 3*:** Project staff will review teachers' unit plans, lesson plans, using the PBL implementation rubric to determine the amount and quality of STEM themed exposure students experience (Performance Measure 3.1*** & ***Performance Measure 3.2***). The district magnet school STEM Specialist and STEM Instructional Coaches will administer the PBL implementation rubric to all instructional staff at each magnet school in the spring of each project year to collect this information. Evaluators will pilot test the PBL implementation rubric in Year 1 and incorporate item analyses, reliability and validity checks of the constructs it measures.

Performance Measure 4.1: Students' favorable attitudes towards STEM and interest in STEM-related careers will increase over the baseline year by 5 percentage points each year.

Performance Measure 4.2: The percentage of students in each ethnic/racial group, students with disabilities, English Language Learners and low-income students who score proficient or above on district-created engineering tasks/rubrics will outpace New Mexico Standards Based Assessment (SBA) science proficiency each year.

Performance Measure 4.3: The percentage of students in each ethnic/racial group, students with disabilities, English Language Learners and low-income students who participate in interscholastic STEM-based competitions, exhibitions and/or collaborations (robotics competitions, science fairs, ecological monitoring projects, etc.) will increase over the baseline year by 5 percentage points each year.

Data Sources for Objective 4*:** Evaluators will use existing district post-secondary planning tools (e.g. Next Step Plans) to assess ***Performance Measure 4.1, the number of students indicating a desire to pursue STEM post-secondary education. District created tasks/rubrics for ***Performance Measure 4.2*** will assess students' ability to follow engineering and/or scientific processes in problem-solving contexts for students in grades K-12. Student

participation rosters in interscholastic STEM-based competitions, exhibitions and/or collaborations (***Performance Measure 4.3***) will determine success at increasing student interest in STEM. The baseline year for measurement is 2017-2018.

Performance Measure 5.1: By the end of each project year, at each magnet school, teachers and other school professionals will receive at least 40 hours of professional development (workshops, conferences, courses, coaching) directly related to the improvement of curriculum and instruction and/or the development and integration of the magnet theme.

Performance Measure 5.2: By the end of each project year, at each magnet school, at least 75% of teachers and school professionals will report that professional development received through the ***Engineering the Future*** project has improved their ability to integrate the magnet theme into lessons, maintain student engagement in project-based learning activities and improve their content knowledge.

Data Sources for Objective 5: In order to evaluate ***Performance Measure 5.1,*** district staff assigned to the MSAP project will collect professional development (PD) data including the type of training, the number of hours provided and the number of teachers involved and summarize it as it occurs. The evaluator will produce post PD satisfaction surveys to determine how to improve sessions and to what degree information is likely to be included in classroom teaching behavior (***Performance Measure 5.2*****).** Evaluation staff will attend each PD session to administer the survey at each magnet school.

Performance Measure 6.1**:** Parental engagement with the magnet school will increase over the baseline year by 5 percent each year as measured by attendance at school events, volunteering and communication.

Performance Measure 6.2**:** Parental satisfaction with the magnet school will increase over the baseline year by 5 percent each year as measured by survey data.

Data Sources for Objective 6*:** Evaluators will use attendance records, sign-in sheets, teacher communication logs and parent interviews to determine parent participation in school activities (Performance Measure 6.1***). School level staff will collect these records as events occur and submit them to evaluators and the project director annually. The State of New Mexico requires an annual Quality of Education Survey distributed to student families. Five questions on that survey are customizable by schools. One question will specifically ask about satisfaction with the STEM opportunities at the ***Engineering the Future*** schools (***Performance Measure 6.2*).** The Quality of Education survey is produced in English and Spanish. The opposite of parental satisfaction would be dissatisfaction, leading to student disenrollment. Therefore, evaluators will track retention rates of students remaining at the school annually relative to comparison schools and by subgroups including transfer and neighborhood schools.

Finally, this evaluation proposes an annual registration survey designed specifically to determine factors parents use to choose one school over another. Any school of choice breaks basic statistical assumptions associated with random assignment. Self-selection bias with unknown factors poses a significant and often insurmountable challenge for comparative analysis. This registration survey has the potential to capture variables associated with self-selection bias. Parents at both magnet schools and comparison schools will participate in the registration survey annually.

Table 14 shows the measures used to address outcomes including performance measures including the IES required performance measures. PM 1.1 and 1.2 show different perspectives on the enrollment priority. PM 2.2 combines the reading/language arts and math performance measures to save space.

Table 14: Outcome Matrix of Measures

Outcomes	Indicator/Measure

PM 1.1 & 1.2: Annually reduced minority group isolation and low-SES isolation.	Proportions of minority group & low SES enrollments relative to comparison.
PM 1.3 & 1.4: Increased magnet school enrollment overall and voluntary enrollment from outside school attendance zones.	Absolute enrollment & enrollment from outside neighborhood boundary.
PM 2.1: Improved alignment of cross-curricular units of study with state learning standards.	Cross-curricular units with notated upgrades.
PM 2.2: Increased math and reading achievement on standardized state assessments for all students and all subgroups.	Annual state testing results.
PM 3.1 & 3.2: Increased integration of magnet theme (STEM) into classroom instruction.	Log PBL challenges by teacher w/ quality indicator.
PM 4.1: Increased knowledge of and interest in STEM careers evidenced by students.	N students indicating a desire to pursue STEM post-secondary education.
PM 4.2 & 4.3: Increased ability to demonstrate the skills and abilities needed for STEM problem solving.	District created tasks/rubrics. Logs of student participants in interscholastic STEM-based competitions, exhibitions and/or collaborations.

PM 5.1 & 5.2: Increased STEM content knowledge, skills and abilities evidenced by instructional staff through sufficient dosage of PD.	Completion logs w/ participating hours.
PM 6.1 & 6.2: Increased parental engagement in and satisfaction with their students' educational experience.	Quality of education survey (1 of 5 school specific questions).

(3) The extent to which the costs are reasonable in relation to the objectives, design, and potential significance of design, and potential significance of the proposed project.

The ***Engineering the Future*** project inverts the traditional direction of integration, that is, transporting or enrolling minority students to majority-Anglo schools. The State of New Mexico already has open enrollment laws on the books; however, transportation remains a challenge for low-income families. This project begins with under performing schools and converts them to magnet schools that draw higher SES families to these schools. The direction of student flow in this project is from high SES neighborhoods to low. This voluntary desegregation introduces methodological challenges to evaluation of intervention effectiveness.

The evaluation design includes two methods to eliminate self-selection bias as a contributing factor to the intervention outcome, which increases costs. The first method uses methods developed at APS to empirically assign matching schools as comparisons. The second method uses geographical attendance of participating schools to create an additional comparison group. The evaluator has successfully used this method for developing charter school comparison groups in four charter schools; however, this method failed in one charter school.

The evaluator will create criteria to determine if the method is successful in the case of the ***Engineering the Future*** project.

Further, this evaluation includes significant opportunity for project input and formative assessment at the individual school level. This allows program staff to incrementally make program adjustments that improve final outcomes. The program evaluator will take time to develop site-level logic models and feed those results into student, parent, and staff surveys. The purpose of those surveys is to validate the implementation of the program as reflected in the logic model and to eliminate other treatment explanations that might interact with the self-selection bias. The comparison schools must necessarily be part of these surveys to ensure sufficient diversion from the magnet school programs, i.e. treatment differs between experimental and comparison schools. This experimental element increases costs because implementing surveys at comparison schools outnumber the experimental schools. Additionally, evaluation staff will attend all public meetings regarding these schools to gather input to integrate those findings with other data sources program staff can use to adjust program activities.

Evaluation of outcome measures is straightforward. However, state annual test instruments have been changing fluidly for the last 7 years, making direct comparisons difficult from year to year. There is a high probability this change will continue. This evaluation will gather additional assessment data the district has been using consistently for years. The evaluator will combine the additional assessment data with annual test data to stabilize variation associated with changes in the annual test. While this challenges comparison among schools, additional costs are required to develop statistical models that effectively adjust for such changes of annual test instruments. In addition to the required outcome measures, the evaluation will measure student attitudes the district monitors to ensure effective programs. James Popham

(2005) proposed that a student's love of learning is a better measure than any test outcome. APS operationalized this with a factor analysis validated survey that measures student self-efficacy, student engagement, and peer academic pressure, among other attitudes. At the school level, statistical hypotheses associated with this study necessarily predict no difference in major outcomes such as ethnic enrollment and test performance in reading and math. Program staff expect project impact only in the low SES subgroup. These additional attitude surveys will help establish success in the low SES student population as a subgroup. Once again, such analyses take extra time and drives costs up.

Cost savings include soliciting competitive bids for the evaluation. Albuquerque Public Schools selected an independent evaluator without university ties to eliminate high overhead costs associated with university administration. The selected evaluator estimated workload based on deliverables and submitted a competitive bid. Pilot Evaluation possesses the organizational capacity to quickly scale up evaluation operations for this project. With a randomized control trial and quasi experimental designs, the US Department of Education expects the evaluation to take up to 33-55% of the budget (US Dept. of Ed. 2007). This quasi-experimental design would take 8.3% of the project budget compared to many evaluations and will meet WWC requirements and specifications.