A.1 Educational Philosophy

The following section details the distinctive features of Western School of Science and Technology: A Challenge Foundation Academy ("Western Tech: CFA"), including the vision and philosophy of the founding team and the reasons for which the founding team is starting a new charter school.

A. Philosophical Approach to Improving Pupil Achievement

Mission

Western School of Science and Technology: A Challenge Foundation Academy exists to transform Maryvale by improving low-income west Phoenix students' opportunities for advancement in the global technological economy by providing needed preparation for the academic rigors of college graduation leading to career success.

Vision

Western Tech: CFA will sustainably address the educational and economic needs of Arizona's Latino youth. When the school is successful, it provides a proof point in the Maryvale neighborhood that low-income underserved youth can access the educational skills necessary to be successful in the new economy, be prepared for college persistence and graduation, and become integral parts of Arizona's new global economy.

Western Tech: CFA aims to be the first A high school in the Maryvale neighborhood.

Foundational Beliefs

The founding team of Western Tech: CFA wholeheartedly espouses the following foundational beliefs as the core of its philosophy for improving student achievement outcomes in the Maryvale neighborhood.

1. College preparation, application, acceptance, matriculation, and graduation are crucial to students' career success.
2. An educational focus on the fields of science, technology, engineering, and math (STEM fields) is essential for competitiveness in the new, global economy.
3. Strong and inextricable links between schools and communities must exist for schools to achieve their academic mission.

1. College preparation, application, acceptance, matriculation, and graduation are crucial to students' career success.

College is a leading indicator of students' future career success. A 2011 report released by Georgetown University's Center on Education and the Workforce states that "people with a bachelor's degree make 84% more over a lifetime than high school graduates." This discrepancy is actually growing – in 1999, college graduates made only 75% more than non-graduates.[1]

[1] Hsu, T. (2011, Auust 5). College graduates earn 84% more than high school grads, study says. Retrieved from http://latimesblogs.latimes.com/money_co/2011/08/college-gradutates-pay.html.

However, the current state of low-income education in the United States is dismal. Nationally, less than one in ten students from underprivileged backgrounds will graduate with a college education.[2] In Arizona, the situation is even worse. Arizona ranks fiftieth of the fifty states in the percentage of high school graduates who end up matriculating to college.[3]

The situation for Latino students, too, lags far behind that of white students. According to the Morrison Institute of Public Policy, "the percentage of Latinos ages 25 to 34 who had a bachelor's degree or higher increased only 1 percentage point to a total of 9 percent, compared with 32 percent of Whites."[4]

In addition, the secondary schools in the Maryvale neighborhood are not preparing students for college success. At Maryvale's two comprehensive public district high schools, Maryvale and Trevor G. Browne, only 4.6% of students take and pass Advanced Placement (AP) tests – rigorous high schools exams that can lead to college credits.[5]

The founding team of Western Tech: CFA believes that when provided with the combination of a rigorous curriculum, highly-effective instruction, support, and a school culture that places a premium on higher education, all secondary students, regardless of background, can and should apply, matriculate, and graduate from college. Per the statistics cited above, the team believes, too, that college graduation is a key leading indicator of future career success. Through the following ways, Western Tech: CFA will act on this belief and prepare all students for college graduation leading to career success:

- A rigorous college-preparatory curriculum facilitated by the foundational Core Knowledge Sequence, college-level AP courses, and a focus on science, technology, engineering, and math (the STEM fields).
- Highly-effective instruction facilitated by highly-qualified and developed teachers and hybrid learning structures that meets the needs of all students, as determined by data.
- Support through personal college counseling during students' application, matriculation, and graduation from college.
- A school culture that places a premium on higher-education through continuous conversation related to college and annual visits to colleges and universities starting in middle school.

Through these aspects of the academic program and school culture, and a relentless mission-driven focus on college preparatory academics, Western Tech: CFA students will overcome the current demographic trends and apply, matriculate, and graduate from college, leading to career success.

2. An educational focus on the fields of science, technology, engineering, and math (STEM fields) is essential for competitiveness in Arizona's new, global economy.

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[2] Luhby, T. (2011). College graduation rates: income really matters. CNNMoney. Retrieved from http://money.cnn.com/2011/11/21/news/economy/income_college/index.htm.
[3] Teach For America. (2012). Where we work: Phoenix. Retrieved from https://www.teachforamerica.org/where-we-work/phoenix.
[4] Morrison Institute of Public Policy. (2012, April 27). Just released: 'Dropped? Latino education and Arizona's economic future.' Retrieved from http://morrisoninstitute.asu.edu/media/news-events/coming-april-27-dropped-latino-education-and-arizonas-economic-future-1.
[5] US News & World Report. (2012). America's best high schools. Retrieved from http://www.usnews.com/education/best-high-schools.

The Arizona Commerce Authority – the quasi-governmental body charged with increasing Arizona's economic competitiveness – has identified the following as "Target Industries" for growth in the state:

- Advanced Industries:
  - Aerospace and Defense
  - Semiconductor
- Nascent Industries:
  - Bioscience
  - Optics
  - Renewable Energy[6]

The commonality between these industries is their reliance on STEM fields and a highly-educated, high-wage STEM-fluent workforce.

The state's higher education community has also placed an emphasis on STEM fields in the global economy. Arizona State University – the largest university in the Valley, in the state, and one of the largest in the country – acknowledges the importance of mathematics and the sciences to increase Arizona's global economic competitiveness by sponsoring grant programs in secondary schools to "increase the number of students who enroll in and complete college majors in the STEM sectors."[7]

The Office of the Governor also has placed a focus on four STEM-heavy economic sectors to strength Arizona's competitive future: aerospace & defense, green power, science & technology, and small business/entrepreneurship.[8] Because of this focus, the poor mathematics proficiency of neighborhood schools is especially disturbing, both for the Maryvale community and the state of Arizona. In fact, 52% of employers – many of which represent the STEM fields – who have reservations about relocating their businesses to Arizona cite "poor performing public schools" as a reason.[9]

The movement of the Arizona economy towards a STEM focus is especially pertinent for the state's Hispanic students, whose numbers will continue to grow. However, Arizona's Latinos, according to the Morrison Institute of Public Policy, languish in low-wage, low-skill jobs, despite the state's trends towards a STEM-based economy.[10] In addition, the Morrison Institute for Public Policy states in a recent report that "new data and projections point to a future fiscal and economic crisis for Arizona unless the state's Latino educational attainment gap is addressed in a concerted and sustained manner."[11]

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[6] Arizona Commerce Authority. (2012). Business plan executive summary. Retrieved from http://www.azcommerce.com/about-us/business-plan/.
[7] ASU News. (2010, December 13). High school students primed for success in STEM. Retrieved from https://asunews.asu.edu/20101213_primethepipeline.
[8] Arizona Office of the Governor. (2011). Four cornerstones of reform: economic competitiveness. Retrieved from http://www.azgovernor.gov/Priorities/EconomicComp.asp.
[9] Arizona Policy Choices. (2001, October). Five shoes waiting to drop. Retrieved from http://morrisoninstitute.asu.edu/publications-reports/APC01_5ShoesWaiting2DropOnAzsFuture.
[10] Ibid.
[11] Morrison Institute of Public Policy. (2012, April 27). Just released: 'Dropped? Latino education and Arizona's economic future.' Retrieved from http://morrisoninstitute.asu.edu/media/news-events/coming-april-27-dropped-latino-education-and-arizonas-economic-future-1.

For these reasons, the founding team believes that an education rooted in the STEM fields must be provided for Maryvale students in order for them to become successful and competitive participants and innovators in Arizona's new, global economy.

3. Western Tech: CFA must have strong and inextricable links between the school and the Maryvale community to achieve its academic mission.

Western Tech: CFA believes that in order to serve the school's mission, strong and inextricable links between the school and its target community must exist. The following statistics highlight several of the challenges faced by this community:

- Maryvale has one of the highest rates of children born to teen mothers. [12]
- Usage of illegal substances by school-aged Maryvale students is roughly triple that of other Phoenix youth. [13]

Strong community partnerships can specifically address community challenges, and addressing those challenges together can lead to improved educational outcomes. The quotation in the "Making Strides in Maryvale" report summarizes the need for community partners and educational organizations to work together:

> "All the players must work in concert to produce a move forward, to support change in other arenas, and to achieve a longer lasting and more extensive improvements in [Latino] dropout rates than can be achieved through any solitary solution."[14]

A significant body of data exists to support these claims. Consider the following positive impacts of community partnerships, parent involvement, and after school programming options:

- The Parent Institute for Quality Education (PIQE) in San Diego is a proof point that more parental involvement leads to improved educational attainment outcomes, lower dropout rates, and higher college attendance rates – all certainly in line with the needs of the Maryvale community and Western Tech: CFA's mission.[15]
- Studies of afterschool programs concluded that high quality afterschool programs can improve student attendance, behavior, and academic outcomes.[16]

To this end, the founding team of Western Tech: CFA has and will continue to develop partnerships with leading organizations in the area in order to forge close bonds between school and community. Partnerships to benefit students, families, and the overall Maryvale community, especially as relating to the challenges noted above and the school's academic mission, have already been established or pursued with the following organizations: Maryvale Branch YMCA, Stand for Children, Maryvale Adolescent Providers Partnership, Arizona Center for Afterschool Excellence, Community STEM Employers (i.e.

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[12] ASU CVPCS. (2006). Making strides in Maryvale. Retrieved from http://cvpcs.asu.edu/sites/default/files/content/products/Making_Strides_In_Maryvale_Final.pdf.
[13] Ibid.
[14] Ibid.
[15] Ibid.
[16] Afterschool Alliance. (2011). Afterschool programs: making a difference in America's communities by improving academic achievement, keeping kids safe and helping working families. Retrieved from http://www.afterschoolalliance.org/documents/2012/Outcomes_4_20_12_FINAL.pdf.

Boeing, Lockheed Martin, United States Air Force, IBM, Salt River Project, etc.), Teach For America, and Arizona State University. In addition, Western Tech: CFA especially plans to pursue relationships with Science Foundation Arizona, the Arizona Science Center, and other mission-aligned organizations that can support our students, families, and communities.

With these mission-aligned partnerships, Western Tech: CFA will ensure close links to the community and address community and academic needs.

B. Principles Fundamental to Program of Instruction

Aligned with these fundamental beliefs, Western Tech: CFA proposes a rigorous, college preparatory instructional program to address the academic and non-academic needs of the low-income Latino students of the Maryvale neighborhood. Based upon research and experience, this instructional program will improve student educational outcomes, pursuant to the Arizona charter law, A.R.S. § 15-181, by which the singular purpose of charter schools is to "improve student achievement." Accordingly, Western Tech: CFA will ensure an instructional program that increases student achievement according to the following fundamental principles:

- A rigorous college-preparatory curriculum facilitated by the foundational Core Knowledge Sequence, college-level AP courses, and a focus on the STEM fields.
- Highly-effective instruction facilitated by highly-qualified and developed teachers and hybrid learning[17] structures that meets the needs of all students, as determined by data.
- Support through personal college counseling during students' application, matriculation, and graduation from college.
- A school culture that places a premium on higher-education and career success through continuous conversation related to college, annual visits to colleges and universities starting in middle school, and required internships.

A rigorous college-preparatory curriculum facilitated by the foundational Core Knowledge Sequence, college-level AP courses, and a focus on the STEM fields.

<u>Core Knowledge</u>

The Core Knowledge Sequence is a rigorous, college preparatory curriculum for elementary and middle schools. Western Tech: CFA's 7th and 8th grade will utilize the Core Knowledge Sequence as a broad foundational liberal arts curriculum to support the STEM focus in the upper grades. The basic rationale of the Core Knowledge Sequence, as described by its founder, is detailed below.

> For the sake of academic excellence, greater equity, and higher literacy, elementary and middle schools need to teach a coherent, cumulative, and content-specific core curriculum.
>
> Our society cannot afford a two-tiered system in which the affluent have access to a superior education, while everyone else is subjected to a dull and incoherent classroom

[17] In this application, the term "hybrid learning" will be used. "Hybrid learning" is also known as "blended learning."

> experience. Academic excellence, educational equity and fairness demand a strong foundation of knowledge for *all* learners.
>
> — Dr. E. D. Hirsch, Jr.[18]

The Core Knowledge Sequence provides a solid liberal arts base for advanced courses and college and career readiness. Core Knowledge also emphasizes literacy in the content areas. In addition, the Core Knowledge Sequence in middle school math will align to the Algebra Qualifying Test (AQT), an indicator of rigorous academic standards and algebra readiness. Lastly, the Core Knowledge Sequence has been aligned to the Common Core State Standards.

Advanced Placement (AP)

AP courses are college-level courses in several disciplines that will ensure that college-level academic rigor is a bedrock of Western School's Academic Program. Offering AP courses ensures alignment to college readiness standards. Successful completion of AP courses, shown by mastery of the rigorous AP tests, can lead in many cases to college credit.

Science, technology, engineering, and math (STEM)

As mentioned above, a curricular focus on the STEM fields of science, technology, engineering, and math is a crucial focus of Arizona's efforts to integrate into the global technological economy. Not only is this critical to Arizona's economy – but that of the United States as a whole. According to the New York Times:

> There are likely to be 150,000 computing jobs opening up each year through 2020, according to an analysis of federal forecasts by the Association for Computing Machinery, a professional society for computing researchers. But despite the hoopla around start-up celebrities like Mark Zuckerberg of Facebook, fewer than 14,000 American students received undergraduate degrees in computer science last year, the Computing Research Association estimates. And the wider job market remains weak.[19]

A focus on the STEM fields will fulfill the school's mission of preparing students for college readiness and careers in the global technological economy.

Highly-effective instruction facilitated by highly-qualified and developed teachers and hybrid learning structures that meets the needs of all students, as determined by data.

Highly-qualified and developed teachers

Western Tech: CFA believes that the teacher is the single-most important indicator of a child's academic success. Thus, Western Tech: CFA will hire teachers who, at a minimum, meet the requirements for

[18] Core Knowledge Foundation. (2012). About the curriculum. Retrieved from http://www.coreknowledge.org/about-the-curriculum.
[19] Wingfield, N. (2012, September 30). New York Times. Forging tech talent in schools. Retrieved from http://www.nytimes.com/2012/10/01/technology/microsoft-sends-engineers-to-schools-to-encourage-the-next-generation.html?hp&_r=0.

being "highly qualified", as defined by pertinent statute and Arizona Department of Education regulations, but also will invest in teachers' job-embedded professional development.

The entire teaching staff at Western Tech: CFA forms a professional learning community (PLC). Groups of teachers will be assigned to subject-level collaborative teams. Western Tech: CFA's collaborative teams serve as the "first line of defense" for the facilitation of improvement in terms of instructional performance. Collaborative team members will leverage each other's individual expertise in the areas of instructional methodology, pedagogy, planning, management, and execution to improve, with a keen eye on research-based best practices.

Collaborative teams also serve as an action research cohort, identifying their own effective best practices as time goes on and new ideas are tried and tracked and outcomes are analyzed and shared with the group.

According to teacher survey results and feedback from both informal observations and formal evaluations, additional professional development opportunities will address gaps in teacher skill and instructional capability. According to skill and needs noted in these evaluations, teachers will be assigned differentiated paths that will cater to teacher's individualized needs to improve his or her skill. These differentiated paths may include outside professional development opportunities, observations of other teachers, or temporary assignment to a collaborative team dealing with developing similar needs. Professional development opportunities from consultants, outside sources, or school staff will feed into the continuously-expanding institutional knowledge around instructional practice. Such opportunities will be based upon proven, research-based best practices of instructional methodology.

Highly-effective instruction rooted in best practice

Western Tech: CFA's teachers will utilize research-based instructional best practices to deliver content and curriculum to students. Teachers will receive training in the following instructional methodologies, which are identified as best practices through extensive bodies of research:

- Objective-driven instruction
- Cooperative learning structures
- High-yield instructional strategies
- Socratic seminars
- Flipped classrooms
- Differentiation strategies
- Problem-based learning

Each of the above instructional methodologies will be described further in section A.3.

Hybrid Learning[20]

Hybrid Learning is the combination of online and traditional classroom learning that leverages technology to control some element of the time, place, path, and pace of learning. This foundation of learning

[20] National Charter School Resource Center. (2012, September 12). Blended learning in charter schools. Retrieved from http://www.charterschoolcenter.org/webinars.

perfectly reflects the mission of the school to provide an education uniquely suited for the global technological economy. According to Heather C. Staker of the Innosight Institute, over 50% of secondary education will be conducted online by 2019. Western Tech: CFA aims to be an early implementer of this trend in education.

According to the Innosight Institute, schools can reap several benefits from implementing a hybrid learning model. Schools can reach increased educational outcomes for students with less money, teachers, or time. Schools can also provide flexibility around the path, place, pace, and time of learning, thus individualizing the learning experience and tailoring to specific student needs. In addition, schools can take advantage of rapidly-improving technology and communication tools that facilitate learning. Lastly, schools can place 3x teachers (those who achieve three times – "3x" – the learning of average teachers) in front of all students, thus working around classroom capacity constraints.

Data-driven instruction

A school-wide system of assessment will be implemented that is research-based and formulated according to the best practices set forth in *Driven by Data*[21]. According to this system, students and teachers will be held accountable for student learning of curriculum, and how instruction and assessment will ensure responsiveness to student needs. Teachers will be trained regarding strategies to best use data to inform individualized and differentiated instruction.

Support through personal college counseling during students' application, matriculation, and graduation from college.

Western Tech: CFA believes that effective and personalized college counseling is crucial to students' application, matriculation, and graduation from college. A college counselor will be hired to support students through all phases of the college graduation process, including assistance with PSAT- and SAT-aligned test preparation, college application, college interview preparation, scholarship application, college selection, and continuous support for college graduation once students have matriculated.

A school culture that places a premium on higher-education and career success through continuous conversation related to college, annual visits to colleges and universities starting in middle school, and required internships.

To build the focus on the importance of higher education, Western Tech: CFA will build a continuous conversation around college into its school culture. Students will begin conversations around the importance of college in middle school and take annual visits to colleges and universities.

Western Tech: CFA will also emphasize career success. A crucial component of this fundamental principle will be providing students real-life career experiences through required internships in the 11th grade. These internships – with community partners, colleges, and/or universities – will further establish a culture built around career success.

C. Rationale for Target Population

[21] Bambrick-Santoyo, P. (2010). Driven *by Data: A Practical Guide to Improve Instruction*. San Francisco, CA: Jossey-Bass.

The youth of Maryvale are Arizona's economic future, especially since the proportion of Latino children in the state continues to rise. As the negative indicators above attest, their future and the future of the state are currently in doubt. However, the "Making Strides in Maryvale" report identified two key levers to increase the outcomes of Maryvale students: 1) the reduction of delinquent and problem behavior; and 2) academic achievement and workforce development.[22] Western Tech: CFA aims to impact both of these key levers to support Maryvale's youth.

Reduction of delinquent and problem behavior

The evidence and statistics above relating to the importance of school-community partnerships to improve students' behavioral success, suggests that Western Tech: CFA's approach, including strong and inextricable links between school and community, will address the needs of the target population.

Anecdotally, this has proven true at Western Tech: CFA's elementary sister school serving the same target population, Pioneer Preparatory School: A Challenge Foundation Academy ("Pioneer Prep: CFA"). Pioneer Prep: CFA is a community-focused school offering the Stand UP parent program, English classes for parents, an afterschool program in tandem with the local YMCA, and the Project PRIDE community service and cleanup effort. Through these community-focused efforts, Pioneer Prep: CFA has seen incredible increases in both student academic performance and the reduction of delinquent or problem behaviors, including a decrease in student disciplinary action related to illegal substances or vandalism.

Academic achievement and workforce development

Western Tech: CFA will sustainably address the issues of academic underperformance in the Maryvale neighborhood. This underperformance is exemplified by the tragically low current educational outcomes for Maryvale secondary students – currently, only 30.3% score proficient on AIMS Math and 54.7% score proficient on AIMS Reading. Facets of the program of instruction suggest that Western Tech: CFA's approach will lead to increase academic achievement and workforce development in the Maryvale neighborhood.

For example, students completing AP courses are three times more likely to graduate from college; internships ensure students are ready for the workforce and receive more job offers; and highly-qualified and developed teachers utilizing hybrid learning can achieve up to three times more academic growth with their students than other teachers.[23] [24] [25]

In addition, locally, the combination of Core Knowledge has also proven effective at increasing student achievement at Pioneer Prep: CFA. With over 95% of students qualifying for free or reduced lunch and a significant population of English Language Learners, Pioneer Prep: CFA increased its A-F Accountability letter grade from a D to a B in the 2011-2012 academic year. Reading and math proficiency, as measured by the AIMS test, grew 8% and 23% respectively, during the course of the year.

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[22] ASU CVPCS. (2006). Making strides in Maryvale. Retrieved from http://cvpcs.asu.edu/sites/default/files/content/products/Making_Strides_In_Maryvale_Final.pdf.
[23] NMSI. (2010, September 16). AP classes can lead to college readiness. Retrieved from http://www.nationalmathandscience.org/blog/2010/09/16/ap-classes-can-lead-college-readiness.
[24] Hollins University. Real world experiences prepare you for life. Retrieved from https://www.hollins.edu/academics/internships/.
[25] National Charter School Resource Center. (2012, September 12). Blended learning in charter schools. Retrieved from http://www.charterschoolcenter.org/webinars.

The statistics, research, and experiences above suggest that Western Tech: CFA will fulfill the academic needs of the Maryvale community, including increasing academic achievement and workforce development.

Conclusion

While the current situation may be dire, the Morrison Institute notes that "the educational uplift of Arizona's huge Latino population…must move to the center of the state's agenda."[26] Western Tech: CFA will do this, and provide a proof point that low income Latino youth from underserved neighborhoods can succeed and achieve at high levels.

[26] Arizona Policy Choices. (2001, October). Five shoes waiting to drop. Retrieved from http://morrisoninstitute.asu.edu/publications-reports/APC01_5ShoesWaiting2DropOnAzsFuture.