



*The following is an excerpt from element one of the charter. It explains, in a little more depth, our philosophy on education and some of the features of our program.*

## **VISION**

Sherman Thomas Science, Technology, Engineering, and Mathematics (STEM) Academy is a high-achieving middle school that is dedicated to academic excellence. Our goal is to develop both academically and socially successful students in preparation for high school and post-secondary education, to be competitive, contributing, and productive members of the 21<sup>st</sup> century global economy.

## **MISSION**

The mission of Sherman Thomas STEM Academy is to prepare students, through rigorous and relevant content, to be productive and successful citizens by developing a strong work ethic and the higher-level critical thinking skills needed to solve problems in the 21<sup>st</sup> century world.

## **CORE VALUES**

We believe...

- Schools provide a safe, positive, organized setting with clearly defined behavior expectations. When school climate is safe, and content is highly challenging, accelerated learning takes place.
- Every child must be held to clearly articulated high expectations of academic achievement.
- Knowledge and application of current technology prepares students for tomorrow's world.
- Building upon a strong foundation in language and math proficiencies, students will become fluent in:
  - o Scientific Literacy: The knowledge and understanding of scientific concepts and processes required in 21<sup>st</sup> century society
  - o Technological Literacy: The knowledge of what technology is, how it works, purposes it serves, and ways it can be used
  - o Informational Literacy: The ability to locate, evaluate, synthesize, and utilize information effectively across a range of media
- Effective character education enhances the academic program, while developing habits of professionalism. This creates a more competent 21<sup>st</sup> century workforce.
- Parents are the first and primary teachers. They are responsible for their children's basic needs and values.
- The members of our community offer a wealth of experiences. The most motivating career education comes from engaging with those directly in the field.

## **EDUCATIONAL PHILOSOPHY AND PRACTICES**

The term "bridge" has multiple meanings. The most general of these is a connecting, transitional, or intermediate route or phase between two adjacent elements, activities or conditions. The

Sherman Thomas STEM Academy strives to bridge students' "school knowledge" with their understanding of their "real world" and future. Our *cross-curricular* planning and instruction, *inquiry approach* to learning, and emphasis on *professionalism* all serve to stretch students' views of their world beyond the desk and textbook.

Another, more specific meaning of the term "bridge" is a platform from which a vessel is navigated. We use that meaning when we speak of "meeting on *the bridge*" for daily group instruction. Students begin their day on the bridge, where announcements can be disseminated by the "captain" (principal) and basic knowledge can be taught at once, putting all students on a level playing field before they break off into collaborative task groupings, much like the crew of an efficient ship.

A third meaning for "bridge," as it applies to time, is a transitional passage. Our unique scheduling (slightly longer days Monday through Thursday) allows us time to cover California-approved standards and then revisit them on half-day Fridays (a transitional passage from one week of learning to the next). These Fridays are designed to expand and apply what has been learned in a variety of ways. Most frequently, however, these special Fridays will provide time for students to "get their hands dirty" with experiments and projects. These *Challenge Days* are designed to foster collaboration with a variety of stakeholders and put their application of knowledge to the test. Fridays are a time to showcase Madera for our students, and to showcase our students to Madera.

### ***Cross-Curricular Lessons***

Today, we live in a global landscape. We interact with people from cultures around the world, some aspects of which are similar to our own, and some very different. That variety can be observed not only via digital means (TV, internet, news services), but right here in Madera. We can get information, products and services from anywhere on Earth, through the use of technology, at a variety of costs. This was not the case throughout history, and as our world has developed, it has practiced *connection* and *change*. Students today need to see not only how all facets of our world are connected, but also how, why and to what value (positive or negative) change has taken place.

At STA, we will explore these practices of connection and change in all curricular areas. STEM concepts are best taught holistically, daily, and across all disciplines, rather than as a once-a-month project. Principles of Science (hypothesizing and investigating), Technology (improvements that foster ease of a task), Engineering (design specific to a task), and Mathematics (comparison and operation of number systems) all work together and can be applied to other areas of study. While our focus is on STEM, connections can be made not only among these disciplines, but also with English/Language Arts, History, Visual and Performing Arts, and Physical Education.

Examples of bridging the curricular areas are to work through a Science Fiction book for Literature, and share out valid/invalid scientific concepts or theories as they unfold through the story and connect events to History to compare fiction to reality or future to past; examine, draw or build an architectural model of a structure from the Renaissance, employing mathematical skills in angles and measurement, scientific principles of load and gravity, and artistic features

such as line, color and shading; use knowledge of simple machines and/or physiology to work or test specific muscle groups in Physical Education.

Teachers will plan, explain and model this skill of connecting, to increase student awareness of not only what is already part of our world, but what *could be...* that is, developing a student's own abilities to connect. This is at the heart of the concept "life-long learner." Pushing beyond connections, STA will strive to encourage students to consider change. Changes of the past and present can be argued as having a positive or negative impact, and students must employ critical thinking skills to make those arguments. What cannot be argued, however, is the fact that change has occurred and will continue to occur in the future. An inquiry approach to learning in all subject areas will lead students to see how they, as members of society, can influence that inevitable change.

### ***Inquiry Approach***

The inquiry approach to learning is an open-ended, investigative, and student-centered method of allowing learners hands-on and minds-on opportunities to solve problems and test ideas. There is more emphasis on "how we come to know" than on "what we know," which is a more traditional approach. At STA, we understand that traditional methods have been given such stature because they *do* work, for many people and over long periods of history. However, we also believe that inquiry methods do a better job of teaching about *thinking* and *learning*, rather than repeating. This is another point at the heart of a "life-long learner."

An example of this inquiry approach to learning is to pose and ponder the question, "When and why do I use proportional comparisons?" Students will consider and discuss the ideas of comparison and proportion, design models or theories (which they then test and discuss with their peers), and work toward a presentation of their findings whereby they explain their understanding of proportional comparisons and their applicability in life.

Our world is changing, and we can be *leaders of change* or *followers of change*. Change will come, regardless. Students who engage in investigative processes drive themselves farther along the path of understanding. They question their world, its past and future, its processes and products, its rhyme and reason. They will be more employable in the workforce, at higher income levels.

### ***Professionalism***

Today's job market is competitive. Impressive skills in professionalism will not only spotlight candidates for a prospective employer, but also assist that candidate in retaining the job they have worked to gain. STA believes that such skills of professionalism need to be taught directly, as well as modeled to our students, giving them an edge as they progress through both education and career. Competency in filling out applications, forms and reports, greetings and behavioral habits that put a prospective client, team or boss at the focus of a task, and presentation of accomplished work are all important skills every employee, in any field, should be able to handle effectively. We strive to focus attention on these skills to build students' awareness of how professionalism can impact their future.

### ***“The Bridge”***

Many jobs today require time to be spent working *collaboratively* as well as *independently*. At STA, we offer a balance of both models in terms of student work, whereby students have some tasks to complete in partnership with stakeholders (peers, parents, community members, etc.) and other tasks to complete independently. In addition to student work, however, we model these styles with teacher-led instruction as well.

To facilitate students’ work collaboratively among a larger span of age groups and abilities, and with multiple teachers, we bring students and staff together daily, “meeting on the bridge” for whole school instruction, particularly in Science (a component of STEM), to teach all grade levels together. The National Next Generation Science Standards, or NGSS, in grades 6-8 are set up in a band of 11 Disciplinary Core Ideas (DCI’s) that are not delineated by grade level. Rather, they are interchangeable among these grade levels. At STA, we will cycle through all 11 DCI’s repeatedly over the course of a student’s three years of attendance, so they will have multiple exposures to each topic. Each time a specific topic is introduced, the core of standards will be covered (refreshing a student’s memory, setting the stage for deeper understanding each time), but then a new line of inquiry will be offered. This inquiry model opens the door for students to think critically about the topic and explore, through research, experimentation, and collaboration. Assessment of each unit may include standardized questions as well as a demonstration of work produced during the inquiry process.

This practice of meeting on the bridge mimics a common practice in many industries, whereby workers meet to gather basic knowledge and understand the parameters of a task, brainstorm, and then separate into smaller groups or individuals to research and complete said tasks. Bringing it all back together for presentation to the client or manager culminates that project.

### ***Challenge Days***

Every Friday is designed to be unique from the rest of the week at STA. There are many studies about the psychological benefits of taking a break from routine and coming back refreshed and recharged. We feel that these breaks are important, and can be built around our educational goals to fit within our philosophies about STEM and career readiness.

Years of observation in the classroom have consistently shown us that student performance by mid-day Friday is very low compared to any other time during the week. Student attention is turned to weekend plans, parents tend to pull their children early for travel or errands, and students are simply exhausted from their busy lives outside of the school day.

To that end, we will operate a half-day program on Fridays, with a motivating hook to keep attendance high. Some Fridays will be used for field trips and community visitors, sharing about careers and seeing professional projects as they happen, particularly in STEM fields. Most days will be what we like to call “Challenge Days,” whereby a specific challenge is issued with restrictions or parameters in place, and students work in collaborative groups to achieve the task or outperform other groups.

An iconic example of an appropriate challenge is for students to be given a limited set of supplies and told to build a bridge (ah... the bridge again!) that will support a specific load (or

the heaviest load). One can imagine the excitement buzzing as students plan, build and test. These challenges require research, problem solving, project management, and presentation skills.

We will seek “guest teachers” from Madera to join us for these Challenge Days, where they will work alongside one or several groups of students, providing knowledge, organizational or planning advice, and encouragement. At STA, we recognize that Madera has hundreds of professionals, both in the field and retired, that have much to offer students, and their expertise will only be handed down to new generations if we invite them into our school and provide the time and materials to facilitate that gift.

## **CHALLENGING CURRICULUM**

We believe the following to be true at the Sherman Thomas STEM Academy:

*“Standards describe what to teach, not how to teach it. Standards-based education maintains California’s tradition of respect for local schools. To help students achieve at high levels, local school officials and teachers – with the full support and cooperation of families, businesses, and community partners – are encouraged to take these standards and design the specific curricular and instructional strategies that best deliver the content to their students.” – California State Board of Education - 1997*

### ***Introduction***

At STA, we place great emphasis on bridging content in all curricular areas, making connections among all core and non-core subjects. Our focus is on STEM subject areas, but our goal is to deliberately connect all subject areas. The STEM subjects of Science and Math are core subjects and will be given the most direct instruction to cover state-approved standards, but Technology and Engineering principles are also applied to all areas of instruction, particularly as they foster design, problem solving, collaboration and communication among students. Students have the opportunity to work in multi-age, multi-grade, and mixed ability groups. STA’s small size and commitment to personalization allow for teachers to exercise great individual flexibility and skill to better serve our students.

### ***Core Subjects***

The instruction and materials of the core subjects of Mathematics and ELA will align to California-adopted Common Core State Standards. History standards are currently in the process of revision at the state level, and at the time of our opening we will be aligned to those new standards. For Science, STA will align instruction and materials to national Next Generation Science Standards (NGSS). California has delineated the middle school (6<sup>th</sup>-8<sup>th</sup> grade) NGSS by grade level. While Charter Law does not require charter schools to follow state standards (they are required to be assessed on state standards), as we are teaching all national standards each year, we will therefore be covering all state standards for each grade, each year. California state approved NGSS standards will be spiraled through each year. Our daily instruction model gives us an additional 85-325 minutes of science instruction each week over the instructional minutes of a traditional middle school (based on a traditional middle school having science once a day for a 55 minutes period, and STA having a science block four days a week for 90 minutes in addition to most Fridays being a 4 hour hands on block of time for project based learning, which will incorporate science and other disciplines).

### ***Non-Core Subjects***

Non-core subject areas (which may include but not be limited to Technology, Visual and Performing Arts, Professionalism, Robotics, Journalism, Rocketry, Foreign Language, Greenhouse, Aquaponics) will be integrated into our instruction where applicable. In addition, STA will have Physical Education instruction that meets the minutes required by the state of California. To further encourage physical activity, STA students will be allowed to participate in sports programs at their district attendance area junior high campus. STA parents will be fully responsible for transportation to and from practices.

### ***Minimum minutes of instruction requirements compared to STA***

STATE REQUIREMENT ED CODE 46201(a)(3)	STA MINUTES OF INSTRUCTION
54,000 MINUTES	62,310 MINUTES

### ***Daily Schedule***

DAY(S)	ACTIVITY	TIME
Monday – Thursday	Instruction Block A	8:00am – 10:15am
	Break	10:15am – 10:30am
	Instruction Block B	10:30am – 12:15pm
	Lunch	12:15pm – 1:00pm
	Instruction Block C	1:00pm – 3:30pm
Friday	Project Based Instruction	8:00am – 12:00pm

During Instruction Block A, “bridge time”, all students will be together for announcements, science and technology instruction. This instruction will encompass covering all eleven Disciplinary Core Ideas (DCI’s) in the NGSS, integrating science and engineering practices and California Common Core State Standards Connections, which include English Language Arts (ELA) and Mathematics as outlined in *A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas*. Revised March 2015. Students will learn to use a variety of digital resources and tools in research, experimentation, and presentation of new understanding.

During Instruction Blocks B and C, students will be in grade specific classrooms for grade specific instruction in Math, ELA, and History. Other subjects to be integrated into the core instruction are to include, but not be limited to, music, art, foreign language, etc. Physical Education will occur daily during Instruction Block C.

The focus of Fridays will be project based instruction, which will take on many different forms. Some Fridays will be used for field trips and community visitors, sharing about careers and seeing professional projects as they happen, particularly in STEM fields. Most often students will be engaged in hands on projects, “challenge days”, working in collaborative groups on a project to achieve a specified task. These projects will be geared towards what the students have been learning in their science class, providing application and hands on learning to concepts.