APPENDIX B1

I. Computers and Technology

SASV Computer Curriculum can be roughly classified as Computer Literacy, middle school Computer Science electives and high school Computer Technology and Computer Science electives.

I.1 Computer Literacy

Computer Literacy covers the technology skills that are essential for a 4-year S&E major and the basic skills that lead to various IT and computer science related careers. The curriculum not only covers the technology skills but also integrates them with Math, Science, English, and History/Social Science through hands-on activities. The set of essential technology skills are derived from the syllabus of International Computer Driving License (ICDL). The ICDL is the world's largest end-user computer skills certification program, with more than 20,000 test centers, 7 million students and 2 million certificate holders in 146 countries including the United States. It is a globally recognized credential that certifies an individual as competent in using computers and covers all the computer skills that students need to have to be successful in college and at work. It provides a superior syllabus that is uniquely validated to ensure that it is always relevant, up-to-date, and meaningful. Many students are consumers of technology without a basic understanding of the underlying principles of how technology works or how to choose the right combinations of tools for projects. The ICDL integrated curriculum ensures that they graduate from SASV as technology-literate individuals.

I.2 Middle School Computer Science Electives

In grades 6 through 8, students may be offered Computers and Technology courses as electives. For the 2015-16 school year, these electives include Computer Science, Computer Programming, Digital Art, and Robotics.
STEM Academy of Silicon Valley implements a Computer Science curriculum that complies with Computer Science Teachers Association (CSTA)'s 'A Model Curriculum for K-12 Computer Science.' This model has four levels:

Recommended Grade	Level
K-8	Level I-Foundations of Computer Science
9 or 10	Level II-Computer Science in the Modern World
10 or 11	Level III-Computer Science as Analysis and Design
11 or 12	Level IV-Topics in Computer Science

SASV Computer Science curriculum is one step ahead of the above chart since Level I and a big portion of the Level II topics are already covered in the middle school computer program. Level III and IV topics are covered in high school.

I.2.1 Computer Science I is designed to introduce middle school students to the breadth of the field of computer science through an exploration of engaging and accessible topics. The course is designed to focus the conceptual ideas of computing and help students understand why certain tools or languages might be utilized to solve particular problems. The goal of *Computer Science I* is to develop in students the computational thinking practices of algorithm development, problem solving and programming within the context of problems that are relevant to the lives of today's students. **In the introductory computer science course, middle school students**

1. **learn the basics of computer hardware**
2. **learn and apply the concepts fundamental to computer science such as binary numbers, representation of images and text using numbers and logic gates.**
3. **express themselves creatively using web pages they design and construct themselves using HTML and JavaScript**
4. **mature in their problem solving, algorithmic thinking and programming skills using Python, Java and Scratch.**

I.3 High School Computer Science and Computer Technology Electives

In high school, students are required to take one year of Computers and Technology courses before graduation. High school curriculum is composed of the new College Board Computer Science Principles course, AP Computer Science course, Introduction to Programming and Digital Arts.

I.3.1 College Board Computer Science Principles

SASV is an official pilot of the new College Board Computer Science Principles course which is funded by the National Science Foundation. See csprinciples.org and apcsprinciples.org. The following are the themes offered in this course.
Creativity A key theme of the Principles course is its focus on creativity. It's not enough for students to know that "computing requires creativity." Rather, we want them to actually be creative: creating artifacts that they want to show off to their friends and family, using simulation to explore questions that interest them, and designing and implementing solutions employing the iterative and sometimes messy process that artists, writers, and engineers use to translate ideas into tangible form.

Technology to Solve and Create A second theme is the course's use of technology as a means for solving computational problems and

exploring creative endeavors, rather than a focus on a specific tool or language. To that end, the course highlights programming as one of the seven big ideas of computer science, because programming is among the creative processes that help transform ideas into reality. Programming will be a tool students use to explore concepts and create exciting and personally relevant artifacts. The Principles course will not focus on nor be organized around a specific language. The instructor of the course will select one or more languages, based on appropriateness for a specific project or problem and according to guidelines provided as part of the course specification. Language specifics will be taught only to the extent that students need them to produce their programs. Similarly, students in this course will work with "big- data"—to analyze it, to visualize it, to draw conclusions from trends in it—but the course itself does not specify particular tools for these explorations.

Broad Appeal A third theme that will help the course appeal to a broad audience is the course's focus on people and society, not just on machines and systems. Students will explore computer science's relevance to and impact on the world today. They will investigate the innovations in other fields that computing and computer science have made possible. They will examine the ethical implications of new computing technologies. They will perform activities that develop their communication and teamwork skills. Students in this course will work individually and in teams to solve problems. They will talk and write about their solutions, the importance of these problems and their impact on the world.

I.3.2 AP Computer Science

This is the traditional AP Computer Science course which focuses on problem solving and algorithmic thinking using the Java programming language.

I.3.3 Introduction to Programming

This course teaches students with no prior programming knowledge, the fundamentals of programming using the three basic tenets of programming:

- Sequencing of statements
- Conditionals or if-then statements
- Iterative statements or loops

The programming languages used will be Scratch and C++.

I.3.4 Digital Arts

I.4 A+ Program and Computer Science

In addition, SASV's A+ (Advanced STEM) Program offers in-depth advanced algorithms and programming studies for more interested and gifted students. The A+ program inspires students to pursue graduate studies in Computer Science as well as other S&E areas since through this unique program students already master many undergraduate-level computer science topics in high school and start taking advanced level or masters courses even in the beginning of their college education.