SYA Mathematics Guiding Principles

The following guiding principles form the foundation of the SYA mathematics program. All decisions regarding the program will be made in the context of these guiding principles:

- **Well-Defined & Comprehensive Math Program:** SYA will offer a set of well-defined and comprehensive mathematics courses that prepare students to return to their home school for their next course in mathematics.
- **Common Courses Across Campuses**: A common mathematics curriculum and supporting content will be implemented consistently at all SYA campuses using the online courses in the Canvas LMS.
- **Independent Learner Focused**: SYA math courses will focus on developing two of the core student skills highlighted in the SYA Mission Statement:
    - *Independence & Interdependence* - The ability to be self-reliant and collaborate with others in a constructive way.
    - *Critical & Creative Thinking* - The ability to develop new ideas and challenge assumptions in situations with limited information and/or ability.

  These skills focus on helping students develop as confident, independent learners. These skills will be developed by students and modeled by their teachers in the SYA mathematics courses.

The remainder of this document includes additional information that will be helpful for SYA staff and mathematics teachers in better understanding the approach being taken, the desired benefits, and some of the challenges that will likely be encountered.

Enabling Principles

The enabling principles below focus on a variety of areas. These principles are important to both further defining the Guiding Principles as well as in describing how the Guiding Principles will be supported.

- **Teachers Model Independent Learning**: Teachers will actively communicate and collaborate online with each other and all SYA students to:
    - implement the SYA mathematics curriculum,
    - develop and improve course content, and
    - support the approach to teaching and learning described in this document.
- **Common Content & Processes**: Courses will be delivered using common, shared content, including assignments and assessments as well as supporting processes.
- **Online Content**: All course content will be developed/maintained electronically and be accessible online via Canvas, the SYA Google repository or using other (agreed) Internet-based tools (for example, Khan Academy or Desmos/Geogebra apps).
- **Online Communication**: Students and teachers will actively participate in cross-campus, shared online discussions to post/reply to questions related to their math

courses. The online forums will be the primary communication tools for the courses outside of class. Consistent, quality participation in the online community is a critical success factor for students and teachers.

- **Teacher as Facilitator/Coach**: Teachers will be more focused on student interaction, assessment, and providing timely formal/informal feedback during face-to-face classes and online. Their primary role will be to help coach students to become improved independent learners and problem solvers - versus preparing and delivering “packaged knowledge” directly to students and “providing answers/solutions” for all problems during class.

Anticipated Benefits

- **Independent Learning Skills**: Students (and teachers) will develop enhanced independent learning skills[1]:
    - **Curiosity** – Independent learners want to find out more about the world. They seek out ways to explore. They learn from various angles and formats, not just traditional instruction. They are proactive and find ways to access additional lesson supplements on their own.
    - **Self-motivation** – Intrinsic motivation far surpasses any prize or reward system. Independent learners are motivated by setting internal goals to achieve. They are driven by their own personal achievement.
    - **Self-examination** – Where have you been and where are you going? Independent learners know how to evaluate themselves. They can see their strengths and weaknesses. They strive for measurable progress and often chart their accomplishments and failures.
    - **Accountability** – Responsibility means knowing what you have to do and doing it without anyone telling you to. The sooner a student becomes responsible for consequences, the less dependent he will be on outside sources for discipline or motivation.
    - **Critical thinking** – Independent learners think critically of a situation. They examine all possibilities and often come up with multiple solutions. They don't just memorize. Rather they ask "Why?" and formulate answers based on observation and intelligent deduction.
    - **Comprehension with little or no instruction** – Independent learners have an uncanny ability to read, visualize, or kinesthetically instruct themselves. No matter the topic or subject studied, an independent learner will find ways to understand material through application (generally trial-and-error).
    - **Persistence** – Independent learners don't give up. They strive to understand a concept as much as possible on their own before asking for help. They also apply self-discipline in finding answers to a problem. They teach themselves and generally only ask question after failure to find a solution on their own.

- **Just-in-Time Support**: Online content and discussions will provide students and teachers access to the information and support they need when they need it (not just during a face-to-face class or an ad-hoc meeting).

[1] Based on http://www.aoacademy.com/7-characteristics-of-independent-learners

- **Consistency in SYA Mathematics**: The SYA mathematics courses will be delivered in a consistent manner across campuses from year-to-year.
- **Leverage Teacher Time**: Adherence to a common curriculum and use of common content will help leverage teacher time to allow more time to be spent supporting students and less time developing course content and prepping for courses. NOTE: It will take multiple years to fully realize this benefit.
- **Continuous Improvement**: The quality of the courses and the supporting content will improve over time (during the year and from year-to-year) as teachers and students provide feedback and collaborate to improve the learning experience.

Anticipated Challenges

The challenges marked with a ✪ are critical to monitor. Failure to address any issues stemming from these challenges can quickly derail a class or the entire program if not addressed early in the year.

- ✪ **Teacher Independence/Past Experience**: Most teachers are accustomed to having complete independence and total control of their classes and what is communicated to their students (they "close the door to their classroom" and become the "king/queen" of the class). In the SYA math environment this is not the desired behavior. The goal is to co-teach a common course across campuses and to collaborate with other teachers to agree on changes and support continuous improvement - think of each local campus class as a section in a larger class that spans all campuses. Teachers will struggle to adopt this mindset and to adjust to the new way of doing their job (some will refuse). This approach requires making compromises and "learning new tricks", which can be very hard for teachers who have been doing things "their way" for 20+ years.
- ✪ **Transitioning to Independent Learning** (for students and teachers): Students will need active support in their transition to a more independent learning based approach to mathematics. This will also be a challenge to teachers and administrators who are accustomed to "helping" students at the first sign of difficulties (by giving quick answers/solutions) or who want to shield students from the negative consequences of their own bad decisions (poor planning and time management, over reliance on other students, failure to self-assess their understanding, unprepared for assessments...) or who just want to make sure that the students are "happy".
- ✪ **Student Expectations of Mathematics at SYA**: Many students arrive at SYA with the expectation that their courses in mathematics and English are a lower priority than their host language-based courses and their immersion in the host country culture. When they discover that they will need to spend significant time on their math course in order to be successful it can be a bit of a shock. And, some will push back on working on their mathematics. The expectations need to be made clear early in the course and reinforced in all feedback on assignments and assessments.
- ✪ **Student Time Management:** The independence and opportunities (both good and bad) available to students at SYA are significant. Focusing on academic activities is a secondary priority for most SYA students. Success in an SYA math course requires

discipline and strong organizational and time management skills (see independent learning). This reality creates a conflict that is very difficult for students to reconcile. Additionally, students in high school are traditionally weak in time management, prioritization and organizational skills. This is one of the biggest challenges each year at SYA - in all academic areas, not just mathematics.

- **Technology Access and Skills**: Students (and teachers) will need access to technology (laptop with Internet) and may need to develop new skills to be fully functional in an online enabled course. Orientation activities will be provided to help students and teachers develop the needed skills.
- **Self-Consciousness Limits Participation**: Some students will be highly self-conscious and afraid of "making a mistake" (personal fear) or "what others may think" (social fear). This may hold them back from actively participating in the online discussion or from proactively seeking help when it is needed. Teachers must focus on helping students overcome this fear as quickly as possible.
- **Disagreement Along the Way:** Students (and teachers) may push back on this approach to learning. This is quite natural, is expected, and will need to be taken into consideration early in the process. However, at the end of the day, decisions have been/will be made and the courses will move forward in that context. How individuals choose to respond will determine associated consequences. As noted above in the "Accountability" skill for independent learners: "The sooner students become responsible for consequences, the less dependent they will be on outside sources for discipline or motivation."
- **Spectrum of Student Mathematical Background**: There will need to be support structures in place (for example, ample office hours) for a broad spectrum of mathematical backgrounds within a single course, including the provision of options for less-prepared students to have opportunities to "catch-up" during the year (i.e., earn an "A" or "B" in the course). Teachers must agree on a common approach for addressing this issue (tutoring, test corrections, course changes...).
- **Start-up "Challenges"**: There will be start-up challenges. Teachers and students must be patient, proactive and address the challenges with the end goal of becoming more collaborative, independent learners always in focus.