Program of Studies

2010-2011

Academy for Science and Design
School Administrative Unit #401
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Change History

5/20/2010 - Fixed typos, reversed semesters for EG100 & EG200
4/14/2010 - Board approved
4/4/2010 - Curriculum Committee approved

Table of Contents

Mission

The mission of this chartered public school is to create a world class, standards setting middle/high school that specializes in science, mathematics, engineering, and design.

The school will graduate students with in-depth subject mastery; real world laboratory experiences; and local, national, and global understanding and applications. The school will be recognized for its outstanding academic program and for well-rounded students with the capacity for high achievement and leadership in college, career, and society.

Graduation Requirements

The school's definition of "credit" shall be completion of a high school or college level course with demonstrated content mastery. The school will accommodate students whose grasp of content requires more or less than one year, but credit will not be given for partial or unsatisfactory completion of a course. Students will begin to earn high school credits when they enter the Academy for Science and Design, as early as in the 7th grade.
Graduation requirements were researched to correspond to requirements for acceptance at colleges known for outstanding programs in science, math, and engineering. The school will respond to any new college requirements that emerge over time.

- Applied Mathematics through Calculus (5 credits)
- Applied Laboratory Science (3 credits required plus 1 credit elective):
- Engineering (0.5 credits required plus 0.5 credit elective)
- Computer Science (0.5 credit)
- World Language and Cultural Studies (3 credits)
- English/Literature (4 credits)
- Social Science/History (3 credits)
- Visual and Performing Arts (1 credit)
- Health and Fitness (2 credits)
- Areas of Specialization & Inspiration/Electives (2 credits)
- Stewardship Project (0.5 credits)
- Junior Apprenticeship/Mentorship project (0.5 credits)
- Senior Research Project (1 credit)

Total Credit Requirements for Graduation from the Academy for Science and Design: **27.5**

Types of Courses Available

Leveled Courses

All academic courses at the ASD are associated with a level from level 1 to level 6. The levels indicate an approximate sequence of the classes an ASD student would follow, assuming the student starts in the seventh grade and continues on through twelfth grade. However, due to our mission of graduating students with in-depth subject mastery, which is based on content knowledge and application, students do not necessarily have to spend a year in each level, nor do they always have to start at the level which might correspond to their current grade. The Academy for Science and Design has a process in place to determine mastery, which is based on demonstrating course competencies. (See section on prerequisites for more detail.) Below is the course sequence chart for levels 1-6. Please note that this is a generalized overview and not intended as a rigid prescription for meeting all requirements. In addition, some of the advanced courses shown in the sample course sequence are not available for the current school year and displayed for illustrative purposes only.

Content area w/ Required Credits	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Math (5)	Algebra 1 H(1)	Geometry H(1)	Algebra II H (1)	Pre-Calculus H (1)	AP Calculus AB (1)	
Applied Laboratory Science (3 Required + 1 Elective)	IBC I (.66) Conceptual Physics I	IBC II (.67) Conceptual Physics II ½ yr. Earth & Space Science (8th grade)	IBC III (.67) [Optional H] Advanced Physics H (1)		Elective (1)	
Engineering & Technology (.5 Required + .5 Elective)	½ yr. Technology Design	½ yr. Technology Applications in Society (.5)		½ yr. Engineering & Technology Elective (.5)		
Computer Science (.5)			Computing Fundamentals I (.5)			
World Language (3)	Mandarin I (1) or Spanish I (1)	Mandarin II (1) or Spanish II (1)	Mandarin III (1) or Spanish III (1)			
English (4)	Literature and Composition I	Literature and Composition II	American Literature & Writing (1) [Optional H]	British Literature & Writing (1) [Optional H]	World Literature & Writing (1) [Optional H]	Contemporary Literature & Writing (1) [Optional H]
Social Studies (3)	½ yr. Global Studies	World History I H (1)	US & World History II H(1)	US & World History III H (1)		

Visual & Performing Arts (1)				Elective (1)		
Health/PE (2)	PE (.5)	Health (.5)	PE (.5)	PE (.5)		
Other	½ yr. Integrated Guided Study & Computer Literacy					
Areas of Specialization & Inspiration/ Electives (2)					Intro to Engineer & Architecture Elective H (1)	AP Computer Science (1)
Stewardship (.5)				Stewardship (.5)		
Internship (.5)					Internship (.5)	
Senior Project (1)						Research(1)
= 27.5 credits	7 to 7.5 Classes; 3 High School Credits	7 to 7.5 Classes 3- 5 High School Credits	5-7 Classes 5 - 7 High School Credits	7-8 classes 6-7 High School Credits	4-6 Classes 2.5 - 6.5 High School Credits	1-6 Classes 2 - 7 High School Credits

Credit earned for each course shown in parentheses. 'H' - Honors.

Online Courses

Courses listed in this Program of Studies as VLACS (Virtual Learning Academy Charter School) courses are online instructional programs that will be coordinated and supervised by ASD teachers. VLACS only allows students to register for a maximum of five credits between July 1 and June 30th in a given year.

Courses listed in this Program of Studies as VLACS eStart courses are online instructional programs that will be coordinated and supervised by ASD teachers. Credits earned through eStart are dual credits - high school and college. The online courses are taught by CCSNH faculty. eStart courses are only available to high school juniors and seniors who are enrolled in a public school, private school, alternative school or home school program. The Community College System of New Hampshire eStart tuition is $100. The college credits may be used for degree programs at CCSNH or transferred to other post secondary institutions.

ASD offers all core academic courses and we do not recommend on-line courses as substitutes for core academic courses.

Before registering for any online course, students must complete a Course Pre-approval form (see Appendix or web site), which requires signatures from the student's advisor, parent and the ASD Director or the Director's Designee. The student's advisor will check with the appropriate subject area teacher at the ASD, who will provide the student with a pre-assessment if necessary (see section on prerequisites below) and/or the required ASD competencies to determine mastery upon completion of the online course.

Upon successful completion of the pre-approved online course, students must demonstrate mastery of the ASD course competencies to receive ASD credit. Students must turn in the official VLACS transcript and grade report they receive to the ASD school office no later than two weeks after the end of the ASD semester in which they took the course.

College Courses

Courses identified as Daniel Webster College (DWC) courses are not supervised by ASD faculty members, and are completely under the direction of the DWC faculty. Successful completion of specific DWC courses noted herein will satisfy ASD graduation requirements. All DWC courses taken by ASD students are considered to be at the “Honors” level for that subject area. (See section on “Weighting for All Courses” for further explanation of the “Honors” designation.)

If a DWC class is taken in lieu of the same subject area class at the ASD, the student may be required to demonstrate mastery of the ASD competencies for that course upon completion of the DWC class to obtain ASD credit in that subject area. Students must turn in the official DWC transcript and grade report they receive to the ASD school office no later than two weeks after the end of the ASD semester in which they took the course.

There is no tuition for courses taken by ASD students at DWC, but students (or their parents) must provide their own transportation, to and from DWC, purchase their own textbooks and pay any associated lab fees required by the college.

Areas of Specialization and Inspiration

During their second year of high school, students will begin career planning in their advisory group to emphasize one of the following focus areas in their remaining studies and beyond. These areas may change, or be increased, depending on student interest and teacher availability.

- Architecture and Engineering
- Chemistry & Bio-Medicine
- Space, Astronomy & Astronautics
- Environment & Global Sustainability
- Math & Physics
- Aeronautics & Aviation
- Computer Science, Systems Design & Simulation
- Self-Described with permission of Director

Extracurricular Activities

Non-credit, non-graded half-semester (quarter length) short course electives are an innovative feature offered at ASD. Students achieving mastery in all graded academic courses are invited and encouraged to teach electives to their fellow students to share their expertise and interests while developing their leadership skills, Student instructors may apply preparation and instructional time for their short courses towards the Stewardship community service hours required for graduation (see section below on Stewardship at ASD). Parents and community volunteers are also welcomed as short course instructors.

Previous short courses have included a wide variety of topics such as Lego Stop Motion Animation, Entrepreneurial Activities with E-Bay, Video Game Design, Mini Medical School and much more. The exact classes selected depend upon the students and adults who choose to teach short courses in any given year. Students may enroll in short courses during study halls and/or non-academic course time. Short courses are not graded and do not appear on the students’ transcripts. Students should keep a record of the short courses they have taken and/or taught as a part of their electronic portfolio to assist with college, internship and employment applications.

Prerequisites

Some prerequisite courses are required for advancement to the next level of course work. Whether a prerequisite course is completed at ASD, at another school, online, during the ASD school year or over the summer, mastery of ASD course competencies must be demonstrated before a student can proceed to the next level of coursework. Assessment of mastery may include, but is not limited to, the administration of an ASD comparable final exam, an oral evaluation and/or written requirements.

In general, mastery will be determined by the student's current ASD subject-area teacher before the first day of the semester in which the next level of that course is scheduled to start. If a student is seeking approval of a prerequisite course completed in a non-ASD classroom, the ASD teacher who instructs the prerequisite content will determine if the competencies for that course have been mastered by the student seeking to enroll in the next level of that course sequence. It is the student's responsibility to make a timely request to the appropriate subject-area department to assess the student's eligibility for enrollment in the follow-on course. Requesting a class change to a higher or lower level course, once the semester has begun, may be an impossible task, as explained in the following section.

The course descriptions provide information on the prerequisites required for specific courses.

Course Selection Process and Course Change Requests

Class schedules are prepared in the summer for the fall semester, and in the winter for the spring semester. Schedules are based on the courses selected by students from the Program of Studies, which is revised and re-issued each spring. Students are advised to select courses carefully to meet all of the ASD graduation requirements, to pursue individual interests and skills, and to demonstrate the in-depth subject mastery as stipulated in the mission statement of the Academy for Science and Design. The student, the student's advisor, and the student's parent/guardian are asked to sign and approve the student's Course Selection Form before it is turned in to the ASD office for scheduling. A copy of the Course Selection Form is provided in the Appendix of this document or on the school web site.

A change in the Course Selection Form for the current school year may be requested by a student, parent or a teacher prior to, or during the first two weeks of the semester in which the class begins, assuming several conditions are met. 1) The addition of the student to the requested new class will not exceed the ASD Board approved enrollment size for that class. 2) The student has satisfied the mastery requirements for the requested class, if the change involves moving to a higher level class. 3) There is space and time available in the student's schedule to make the requested change. Schedule changes which increase the student's credit load to more than seven credits or which reduce the student's credits to less than five credits must be approved by the ASD Director. If all of the above conditions are met, and the requested change in class is granted by the ASD Director, the student's transcript will only include the revised class schedule and will not show any class withdrawal.

After the first two weeks of a semester, any request for a class addition and/or withdrawal must meet all of the prior conditions and be approved by the losing teacher, the gaining teacher and the student's advisor. The advisor will also contact the student's parent to communicate and seek approval for the requested course change. In case of disagreement, the student and/or parent may appeal to the Director, who will make the final determination.

If a class withdrawal request is approved after the first two weeks of a semester, the name of the course from which the student is withdrawing and the student's grade at the time of withdrawal will be recorded on the student's transcript. If a course is added after the first two weeks of a semester, the student may be required to make up all work accomplished by the class up to that date. (This is left to the discretion of the gaining teacher.)

To add or drop courses taken through VLACS or through Daniel Webster College, students must follow those institutions' guidelines and confirm any schedule changes with the Academy for Science and Design.

Grading

Mastery is defined as the knowledge of required concepts, application of that knowledge, and the transfer of that knowledge to new situations. Grading is aligned with the determination of mastery; individual course grades are computed quarterly, based on the individual student's progress toward mastery of the defined competencies. Mid-term progress reports and quarterly report cards are issued parents to facilitate communication between home and school and to promote opportunities for prompt remediation when appropriate. Parents and students are encouraged to contact teachers with any questions or concerns they may have about grades and/or the grading system in place at the Academy for Science and Design.

Assessment for mastery may include, but is not limited to, the administration of an ASD comparable final exam, oral evaluation and written requirements. Students must earn a cumulative grade of B- or higher in a graded course to demonstrate in-depth subject mastery of that course. Students who do not achieve mastery in any graded course will not be able to proceed to the next level in that subject until mastery is achieved.

A student who earns a final grade between 70% and 79% is assumed to be partially proficient. Such a student may be able to attend summer school, complete additional written assignments, complete projects or practical applications of subject matter content, and/or do coursework online to demonstrate mastery of the course content at a later date. Any supplemental assignments must be coordinated by the teacher from whom the student earned the partially proficient grade. The same teacher would also evaluate whether or not the partially proficient student has met the competencies for the course after completing the supplemental assignments. Once in-depth subject area mastery is demonstrated, a student will be allowed to proceed to the next level course at the start of the next semester or within the first two weeks of class, whichever occurs at the earliest date. Although a student may be able to achieve mastery in the days or weeks after a particular class has ended, in no case will the original final grade for a completed course be changed.

Art, music, physical education and health are elective courses graded on a pass/fail basis. Students will meet graduation requirements (see Graduation Requirements section above) when earning a "Pass" grade in such an elective. Course descriptions in the Program of Studies explain the amount of credit which will be earned for the satisfactory completion with a grade of "Pass" for each art, music, physical education and health class available at the Academy of Science and Design.

Study halls, homework periods, advisory group meetings and short course electives (described above) are ungraded and do not earn credit toward high school graduation. However, attendance will be recorded in all classes. Students are encouraged to record completed elective short courses in an electronic portfolio.

The grading scale at the Academy for Science and Design, which uses letter grades, is based on cumulative percentages as explained below.

Percentile Range	Letter Grade	Mastery Descriptor
97-100	A+	Exemplary
93-96	A	Proficient with Distinction
90-92	A-	Proficient with Distinction
87-89	B+	Proficient
83-86	B	Proficient
80-82	B-	Proficient
77-79	C+	Partially Proficient
73-76	C	Partially Proficient
70-72	C-	Partially Proficient
67-69	D+	Below Proficiency
63-66	D	Below Proficiency
60-62	D-	Below Proficiency
0-59	F	Failure

Transcripts and Grade Point Averages

Non-Credit Classes

A number of level 1 and 2 classes do not earn high school credit, but are required courses and/or prerequisites for more rigorous, advanced ASD classes beginning at level 3. Grades for non-credit courses are based on the student's demonstrated mastery of ASD course competencies. The letter grades earned for non-credit courses will be weighted only for the purpose of determining Honor Roll status, as explained below, but are not included in calculations of the grade point average (GPA) listed on ASD school transcripts.

Classes Earning High School Credit

Courses taken for high school credit appear on a student's transcript in the year in which they are taken. Certain levels 1-2 classes with content considered by ASD faculty to be equivalent to, or higher than, a typical high school level course in that subject area are eligible for high school credit. This means a middle school student demonstrating mastery in an eligible course will be awarded the designated high school credit for that course, and the credit will be recorded on the student's seventh or eighth grade transcript, with an accompanying explanation provided in ASD's school profile. While such courses earn the designated high school credit, when listed on the student's seventh or eighth grade transcript, they are not included in calculating a high school grade point average (GPA) for class ranking. GPAs for the purpose of class ranking is limited to the credits earned for courses taken during the student's actual high school years, or while the student is enrolled in the ninth, tenth, eleventh or twelfth grades at the Academy for Science and Design.

Please note high school credits earned in seventh and eighth grades should not deter an ASD student from taking even more rigorous courses in math, science, English, and social studies during the student's high school years at the Academy for Science and Design. Also, graduation requirements at the Academy for Science and Design are more demanding than those of most public high schools, and the early accumulation of high school credits during 7th and 8th grades offers ASD students a unique opportunity to enroll in and benefit from additional advanced classes. While college admissions officers don't always review student applicants' middle school transcripts, the degree of difficulty of completed high school courses is carefully examined. Most colleges' admission requirements include a minimum of:

- three years of math,
- three years of science
- four years of English,
- two years of social studies

Very selective colleges typically have additional requirements. Students and parents are advised to review the particular admission requirements of the colleges in which they are interested.

Pass/Fail Courses

Art, music, and physical education are graded strictly as Pass/Fail to encourage creativity, application and adaptation of the instruction by student participants. However, students must receive a Pass grade to be awarded credit. As noted above, courses taken for high school credit will appear on a student's transcript in the year in which they are taken. Pass/Fail courses do not have competency assessments and are not included in calculations of GPA.

Honors Courses

Some ASD and VLACS courses are designated as Honors courses or have an Honors option, and some Honors courses are required at the Academy for Science and Design. All college-level courses and College Board Advanced Placement (AP) courses described in the Program of Studies are considered Honors courses. Honors courses are assigned a higher weight for GPA calculations as described below. Permission to take an honors course must be granted by the ASD subject teacher prior to the start of the course. (Please refer to individual course descriptions for further details.)

Students and parents should understand that Honors courses are designed for highly motivated students who have

demonstrated high achievement and the ability to handle an accelerated pace. Student work in an Honors course requires thoughtful analysis and attention to detail, leading to the synthesis of new ideas and prior learning. Nightly homework may include previewing new material, applying and extending concepts discussed in class, essays and/or technical writing as well as independent research.

College Board Advanced Placement courses have the AP designation preceding the course title. AP courses use the College Board Advanced Placement syllabus and are equivalent to college-level courses.S tudents choosing to take an AP course should anticipate an additional hour or more of homework each night, as well as complex in-class assignments and thought-provoking discussions. Successful students will be prepared to take the College Board Advanced Placement Examination in that course. AP exams are given in May of each year. A student who scores well on an AP exam may be exempted from taking the associated course as a college freshman or may receive college credit, but this decision varies from college to college and may depend on the student's selected major and the college's under-graduate requirements.

Because Honors, AP and college level courses require a higher level of critical thinking, work production, analysis and/or independent research, ASD's weighting system described below has been designed to reflect the rigorous nature of these courses by assigning them higher weights.

Weighting System

The table below explains the weighting system for all completed courses that result in earning a letter grades as described in the this Program of Studies. These weights are used to determine students' eligibility for ASD honor roll, class rank, and computation of grade point average (GPA). Grades earned in Pass/Fail classes are not included in weight computations, although to be eligible for ASD's Honor Roll students must receive a Pass in Pass/Fail courses.

Letter Grade	Normal Weight	Weight for Honors, DWC & AP
A+	4.3	4.8
A	4.0	4.5
A-	3.7	4.2
B+	3.3	3.8
B	3.0	3.5
B-	2.7	3.2
C+	2.3	2.8
C	2.0	2.5
C-	1.7	2.2
D+	1.3	1.8
D	1.0	1.5
D-	.7	1.2
F	0	0

The higher rating is done intentionally to encourage students at the Academy of Science and Design to increase their capacity for learning and their satisfaction in high achievement. As mentioned previously, college admission offices also look at high school transcripts look to see if applicants have taken the most rigorous and challenging courses available to them.

Highest Honors, High Honors and Honors

Determination of highest honors, high honors and honors are based on quarterly report card grades received by the students. All courses resulting in the assignment of letter grades, regardless of the course level designation, are included in the calculation of grade point averages for the Honor Roll.

Students are responsible for turning in the official transcript and grade report they receive from any course taken outside the Academy for Science and Design. (i.e. courses completed online and/or at Daniel Webster College). These must be turned in to the ASD school office no later than two weeks after the end of the ASD semester in which the student took the

course. For VLACS course work, so long as the student has registered ASD as the home school, students do not need to turn in official transcripts.

Regardless of which weight scale is used, the numerical cut points are the same for earning honors, high honors or highest honors at the Academy for Science and Design. Honor Roll certificates are awarded quarterly in a school-wide, peer recognition assembly and celebration.

Honors

Students who have a grade point average greater than or equal to 3.3 and below 3.7 are eligible for Honors. No single grade on the report card can be lower than 2.7 (B-) to demonstrate that the student is at mastery level in all subject areas. Any graded elective course must receive a “Pass” grade.

High Honors

Students who have a grade point average greater than or equal to 3.7 and below 4.0 are eligible for High Honors. No single grade on the report card can be lower than 2.7 (B-) to demonstrate that the student is at mastery level in all subject areas. Any graded elective course must receive a “Pass” grade.

Highest Honors

Students who have a grade point average of 4.0 or above are eligible for Highest Honors. Any graded elective course must receive a “Pass” grade.

Course Descriptions

The following course descriptions describe the courses that will be offered by the Academy for Science and Design for 2010-2011. Class time, location, level, credit and prerequisites are listed to facilitate student selection and scheduling and to aid student planning, not only for the coming school year, but throughout their entire ASD school career. In making course selections, students are encouraged to ask themselves questions about their own strengths and interests, talents, college and potential career goals as well as the ASD graduation requirements. Students are strongly advised to seek recommendations from current and previous teachers, older students, parents and other important people in their lives.

Required Courses

Mathematics

5 high school-level credits are required for graduation in applied mathematics through calculus. This section lists the minimum course work that an ASD student must complete. In order to complete this program please be aware of the following:

- To demonstrate competency all incoming students take an ASD Placement Test in Math.
- If the student does not meet competencies for their entering level the student will be strongly urged to take summer courses to meet the high expectations of ASD to be able to graduate on time.

MATH100 Algebra I Honors **5 Periods/wk** **2 Semesters** **Level 1** **1 credit (required)**

This course stresses the notions of constants and variables in equations, organization of mathematical formulae to isolate subjects of an equation, manipulation of quotients, and familiarity with generalized algebraic descriptions of geometric structures such as a straight line, a circle and simple parent graph curves.

Requirement: This class requires a TI 83 graphing calculator; if students are unable to purchase one on their own some are available on a loan basis from ASD.

Prerequisites: ASD Placement Test in Math

MATH200 Geometry Honors **5 Periods/wk** **2 Semesters** **Levels 2-3** **1 credit (Required)**

This course is designed to provide students with a formal study of plane Euclidean geometry. Emphasis is given to understanding geometry as an axiomatic system of postulates and theorems together with their applications to a variety of problems. Students are expected to use postulates and theorems for geometric proofs in conjunction with the topics being studied. These topics include inductive and deductive reasoning, congruency, similarity, coordinate geometry, constructions and transformations. Students will also analyze characteristics and properties of two and three dimensional shapes and figures as well as to compute surface area and volume.

Requirement: This class requires a TI 83 graphing calculator; if students are unable to purchase one on their own some are available on a loan basis from ASD.

Prerequisites: Algebra I Honors

MATH300 Algebra II Honors **5 Periods/wk** **2 Semesters** **Level 2 or 3** **1 credit (required)**

This course will build upon the foundations of skills adopted during the Algebra I course. The competencies learned in that course will provide a springboard for the study of more complex and interesting algebraic structures and formulations. A detailed treatment of the general polynomial equation will allow students to solidify the vital skill of expansion of bracketed expressions. The concept of exponents will be emphasized, along with detailed multiple repetitions of equations involving radicals. The natural extension to logarithms will permit a deeper understanding of the utilization of exponents. Trigonometric identities will be introduced and learned. An introduction to conic

sections is included. The importance of complete facility and recall of all identities as a prerequisite for Pre-Calculus will be stressed.

Requirement: This class requires a TI 83 graphing calculator; if students are unable to purchase one on their own some are available on a loan basis from ASD.

Prerequisites: Algebra I Honors or ASD Placement Test in Math

MATH400 Pre-Calculus **5 Periods/wk** **2 Semesters** **Level 4-5** **1 credit (Required)**

Pre-Calculus forms the bridge between algebra and calculus. In this course, students will use the tools learned in algebra to study concepts that are essential to the study of calculus. In particular, students will develop a firm understanding of what a function is and will learn how to represent functions, analyze the behavior of functions, and create new functions from old. Students will examine various function classes including polynomials, exponential and logarithmic functions, and trigonometric functions.

Requirement: This class requires a TI 83 graphing calculator; if students are unable to purchase one on their own some are available on a loan basis from ASD.

Prerequisites: Algebra I Honors, Geometry Honors, and Algebra II Honors

MATH500 Calculus AB VLACS **5 Periods/wk** **2 semesters** **Level 5-6** **1 credit (Required)**

An interactive text, graphing software and math symbol software combine with the exciting FLVS on-line course delivery to make Calculus an adventure. This course is designed to prepare the student for the AP Calculus AB exam given each year in May. With continuous enrollment, students can start the course and begin working on Calculus as early as spring of the previous year! All AP courses are designed for students who are willing to accept the challenge of a rigorous academic curriculum. Additionally, AP courses are designed to provide students with a learning experience equivalent to that of a college course. Students should be prepared to dedicate time outside the course for reading and studying for the national exam in May. This course requires motivation, dedication and lots of hard work. Two semesters of the AP course are required.

VLACS Course Code: Calculus AB.

Prerequisites: Pre-Calculus

Applied Laboratory Science

4 high school-level credits required for graduation. 3 required credits, plus 1 elective.

IBC100 Integrated Biology & Chemistry I **5 periods/wk** **2 semesters** **Level 1** **.66 credit (Required)**

This is the first in a three-year sequence of an integrated biology and chemistry course, which is equivalent to two years of high school level courses. At level I, students begin with a study of matter, its composition and classification, and moves to an examination of matter at the sub-atomic level. Topics of study include historical models of the atom, current atomic theory, and covalent and ionic bonding. Students progress to an examination of important biological molecules, cell structure and function, and an introduction to anatomy and physiology, with an emphasis on humans.

Prerequisites: None

IBC200 Integrated Biology & Chemistry II **5 periods/wk** **2 semesters** **Level 2** **.67 credit (Required)**

This is the second in the three-year sequence of integrated biology and chemistry. At level II, students conduct a closer examination of cellular processes, including photosynthesis and cellular respiration (with a closer look at plant anatomy and physiology), cell division, and Mendelian and molecular genetics. Year two includes an analysis

of different chemical reaction types, stoichiometry, and an investigation of factors that influence rates of chemical reaction.

Prerequisites: IBC I

IBC300(H) Integrated Biology & Chemistry III **5 periods/wk** **2 semesters** **Level 3** **.67 credit (Required)**

In IBC III, the third course of the three-year series of integrated biology and chemistry, students study states of matter, phase changes, and solutions, with an emphasis on aqueous solutions and acid/base chemistry. This study leads to an examination of life and its environments on a larger scale, from the level of populations and communities to ecosystems. The course also includes an examination of the diversity of life and evolution.

Prerequisites: IBC II, Earth & Space Science

Honors option available with teacher pre-approval

ES100 Earth & Space Science **5 periods/wk** **1 semester (Spring)** **Level 1-2** **Non-Credit (Required)**

This course is offered during semester 2 to provide timely instruction prior to the administration of the required eighth grade state science test. This is a required course for all 8th grade students. In exploring earth and space, students will investigate four main topic areas: astronomy, meteorology, oceanography and physical geology. Students are expected to develop a conceptual understanding of how the earth works and to use this understanding to make predictions and interpretations of data.

Prerequisites: None

PHYS100 Conceptual Physics I **5 periods/wk** **2 semesters** **Level 1** **Non-Credit (Required)**

Students explore the extensive subfields of physics through the study and research of topics including but not limited to static and current electricity, magnetism, measurement, fluids and mechanics. For each topic, scientific theory, concepts, and applications are pursued. Lab experiences enhance student understanding of basic physics concepts through direct observation of empirical evidence and hands-on learning. Labs introduce students to research basics: how to observe the physical world around them, recording, presenting, interpreting, and analyzing data. Students develop the capability of mapping observational data to mathematical structure.

Prerequisites: Algebra I Honors (may be taken concurrently with Conceptual Physics I)

PHYS200 Conceptual Physics II **5 periods/wk** **2 semesters** **Level 2** **Non-Credit (Required)**

Areas of study from Conceptual Physics I are reviewed, expanded and learned in more depth. Waves, sound, optics, heat are also introduced and explored in detail. At the end of two years, students will be ready for courses that incorporate advanced understanding of both technical theory and practical techniques. Labs are an integral component of this course, with students expected to create hypotheses, collect and interpret appropriate data and write related reports as an individual and/or a member of a team.

Prerequisites: Algebra I Honors

PHYS300 Advanced Physics Honors **5 periods/wk** **2 semesters** **Levels 3- 5** **1 credit (Required)**

This course provides a rigorous mathematical treatment of the concepts learned in Conceptual Physics I and II. Topics such as mechanics, electricity and magnetism, waves and optics, atomic and nuclear physics will be covered in considerable depth. Students explore these concepts using mathematics, with more complex labs and ample opportunities for problem-solving. Students will be prepared to take the SAT II by successfully mastering the course competencies in Advanced Physics.

Prerequisites: Conceptual Physics II and Algebra II Honors (Algebra II Honors may be taken concurrently with Advanced Physics.)

Engineering & Technology

1 high school-level credits required for graduation. .5 required credits, plus .5 elective.

NOTE: Students are required to take EG100 Technology Design and EG200 Technology Applications in Society as a series. Some students may be eligible to take Introduction to the Engineering Design Process which combines the content of both Technology courses into a fast-paced, 1 semester course. See course description to see who may register for EG201 Introduction to the Engineering Design Process.

EG100 Technology Design	**5 periods/wk**	**1 Semesters (Fall)**	**Level 1-2**	**Non-Credit (Required)**

This course provides a foundation for engineering related skills, with a focus on creative problem solving on both an individual and group level. Some key aspects of this course include drafting, maintaining a team engineering notebook, and a Lego robotics or similar project. It is expected that students completing this project understand how to work well in a team environment, where team members are focusing on different areas and coordinating.

AND

EG200 Technology Applications in Society	**5 periods/wk**	**1 Semesters (Spring)**	**Level 2-3**	**.5 Credit (Required)**

This provides foundational knowledge in skills in a number of areas including:

- Materials properties and manufacturing
- Computer Aided Drafting
- VEX robotics, including C programming and team exercises
- Processes and flowcharts
- Ethics

OR

EG201 Introduction to the Engineering Design Process	**5 periods/wk**	**1 Semester (Fall or Spring)**	**Level 3-4**	**.5 Credit**

How do engineers combine creativity, science, and technology to solve the world's problems? This course is an introduction to engineering concepts in a project-based, multidisciplinary format. Students will learn a practical approach to science and engineering and develop skills in problem solving, communication and teamwork. Students will apply engineering analysis and experimentation to laboratory and real life problems.

This course is based on initiatives and recommendations from the Thayer School of Engineering at Dartmouth College.

NOTE: This course is only open to students who are in are at level 3 and above who have not yet fulfilled the Engineering requirement for graduation. This course is designed as a fast-track, make-up course that combines the course work of Technology Design and Technology Applications in Society. This course is not expected to be offered after the 2011-2012 school year as incoming students are expected to take the Technology series courses.

Computer Science

.5 high school-level credits required for graduation.

CS200 Computing Fundamentals I	**5 Periods/wk**	**1 Semester (Fall or Spring)**	**Level 3-6**	**.5 credit (Required)**

This course covers the basic concepts used in computing, including computers, operating systems, applications, networks. It covers very simple data structures and algorithms.This course is intended to cover the minimum any ASD student should have for the computer science area. It is intended that this includes at least minimally functional programming skills that can be expanded later. Expect 3 days of lecture, 2 day programming.

Prerequisites: (EG100 Technology Design and EG200 Technology Applications in Society) or (EG201 Introduction to the Technology Design Process).

World Language and Cultural Studies

3 high school-level credits required for graduation.

MAN101 Mandarin I 5 periods/wk 2 Semesters Level 1 1 Credit

This language is open to students in all grades at the ASD and provides an introduction to the predominant language and culture of China. Students may be heterogeneously grouped by grade to encourage students at varying points of their ASD experience to try this difficult language. Mandarin has very few English cognates, and the pronunciation of Mandarin differs considerably from that of most Western languages. The tonal system presents yet another challenge as a change in pitch often correlates with different meanings of the same Chinese word. In the first year of this three-year sequence, students focus on speaking and listening, reading basic characters and learning some of the cultural aspects associated with China. Basic language skills, such as Pinyin (a phonetic system that uses English letters) and simple sentence structures are introduced.

Prerequisites: None

MAN201 Mandarin II 5 periods/wk 2 semesters Level 2 1 credit

This course follows the successful completion of Mandarin I and continues the study of this World Language with a focus on culturally enriched conversation topics such as school facilities and activities, hobbies, and how to study Chinese. Students gain skills and experience to facilitate communication with native speakers on the selected topics. The course provides instruction to enable students to read Pinyin and to write from dictation. Students will also be introduced to a few Chinese characters.

Prerequisites: Mandarin I

MAN301 Mandarin III 5 Periods/wk 2 semesters Level 3 1 credit

This course follows the successful completion of Mandarin II and continues the study of Mandarin in depth. Students acquire conversation skills in everyday topics such as vacation, community, going shopping, going to see a doctor and one's favorite television programs. Reading and writing in characters is heavily emphasized. Cultural topics are introduced as they relate to current areas of study.

Prerequisites: Mandarin II

MAN401 Mandarin IV 5 Periods/wk 2 semesters Level 4 1 credit

This course is a continuation of a series of Mandarin courses from I to III. It will cover the topical situational conversations, including seeing a doctor, renting a apartment, at the post office, sports, and travel. The students will learn the grammar, familarize them with the culture, practice the conversation skills, and increase their vocabulary to a higher level as compared to Mandarin III.

Prerequisites: Mandarin III

SPAN102 Spanish I 5 Periods/wk 2 semesters Level 1 1 credit

Students learn to obtain information, express feelings and emotions, and exchange opinions by engaging in conversation, reading, and writing in the target language. Students learn to present information, concepts and ideas to an audience of listeners or readers on a variety of topics primarily in the present tense. They gain knowledge and understanding of other cultures. They connect with other disciplines and acquire information. They gain insight into the nature of language and culture in order to participate in multilingual communities within and beyond the school.

Prerequisites: None

SPAN202 Spanish II 5 Periods/wk 2 semesters Level 2 1 credit

Students learn to obtain information, express feelings and emotions, and exchange opinions by engaging in conversation, reading and writing in the target language. Students review material covered in Spanish 1 and learn to present, information, concepts and ideas to an audience of listeners or readers on a variety of topics both in the present and past tenses as well as the imperative. They continue to gain knowledge and understanding of other cultures. They connect with other disciplines and acquire information. They expand insight into the nature of language and culture in order to participate in multilingual communities within and beyond the school.

Prerequisites: Spanish I

SPAN203 Spanish III **5 Periods/wk** **2 semesters** **Level 3** **1 credit**

Students continue to learn to obtain information, express feelings and emotions, and exchange opinions by engaging in conversation, reading and writing in the target language. Students review material covered in Spanish II and learn to present, information, concepts and ideas to an audience of listeners or readers on a variety of topics in the future, past perfect, & conditional tense, and the present as well as past subjunctive moods. They continue to gain knowledge and understanding of other cultures. They connect with other disciplines and acquire information. They expand insight into the nature of language and culture in order to participate in multilingual communities within and beyond the school.

Prerequisites: Spanish II

English, Literature, & Writing

4 high school-level credits required for graduation.This section lists the minimum course work that an ASD student must complete. In order to complete this program please be aware of the following:

- To demonstrate competency all incoming students take an ASD Placement Test in English.
- If the student does not meet competencies for their entering level the student will be strongly urged to take summer courses to meet the high expectations of ASD to be able to graduate on time.

ENGL100 Literature and Composition I **5 periods/wk** **2 semesters** **Level 1** **Non-credit (Required)**

Literature and Composition I introduces and strengthens basic reading, writing, and speaking skills. Lessons are highly structured to focus on reading comprehension, clear writing, correct grammar, active listening, and confident speaking. Particular attention is paid to developing vocabulary for the content areas. Students will read and write a variety of genres, including technical, to learn to use voice and tone for a variety of audiences. One class per week is a double period for a writing workshop to improve writing through small group work, peer editing, and focused writing. By the end of the course, students should be able to read orally 145-175 words per minute (WPM); they should be able to read silently 225-255 WPM.

Prerequisites: None

ENGL200 Literature and Composition II **5 periods/wk** **2 semesters** **Level 2** **Non-credit (Required)**

This course strengthens fundamental English skills. Students will read and discuss novels in a variety of genres, time periods, and styles. Students will apply the writing process to improve organization, clarity, effectiveness, and mechanics. Students will write a variety of well-developed essays and stories, such as compare and contrast, narrative, instructional, mystery, research, etc. Students will learn research skills, such as discriminating authentic sources, outlining, and adhering to MLA regulations. Students will deliver a variety of speeches for different purposes. By the end of the course, students should orally read 170-200 WPM; they should silently read 270-300 WPM.

Prerequisites: Literature and Composition I or demonstrate competency

ENGL300(H) British Literature and Writing **5 periods/week** **2 semesters** **Level 4-5** **1 credit (Required)**

This course introduces students to the major authors, literature, and thoughts of British literature, especially Romanticism. Students will consider how British literature has affected and been affected by the world. Identifying and examining the central themes and ideas of British literature is at the core of the course. Students will critically read, interpret, and examine a variety of British literature from several eras using different lenses from aesthetic to analytical. Students will perfect their writing by composing analytical essays, creative works, and in-class writing assignments. Students who choose the Honors option are required to complete additional readings and assignments.

Prerequisites: Literature and Composition II or incoming 9th grade students

Honors option with teacher pre-approval

ENGL400(H) American Literature and Writing **5 periods/wk** **2 semesters** **Level 3** **1 credit (Required)**

This course enables students to discover and examine American culture and perspective through its literature. Students will critically read, interpret, analyze, and discuss American literature from different time periods, which includes novels, plays, short stories, and poems. Students will also consider course texts within the context of American history and current events. Identifying and examining the central themes and ideas of American literature, especially Transcendentalism, is at the core of the course. Students will continue to strengthen their written and oral communication skills through essays, stories, and presentations. Students who choose the Honors option are required to complete additional readings and assignments.

Prerequisites: British Literature and Writing

Honors option with teacher pre-approval

ENGL500(H) World Literature and Writing **5 periods/week** **2 semesters** **Level 4-5** **1 credit (Required)**

This course will introduce students to literature from various nations and cultures around the world, analyzing and synthesizing the major and common themes, such as man verses man, man verses nature, and man verses self, throughout the various literature over time. We'll look at literature from Europe, Asia, Africa, and the Americas (North, Central, and South). The course will also have SAT essay preparation.

Prerequisites: American Literature and Writing

Honors option with teacher pre-approval

Social Science

3 high school-level credits required for graduation.

SS100 Global Studies **5 periods/wk** **1 semester** **Level 1** **No Credit (Required)**

Global Studies is a half year, middle school level course, focusing on geography and culture. Students will understand and apply the five themes of geography: location, place, human interaction with the environment, movement, and region and interpret maps and data. Students will also understand differing cultures throughout the world. Students will also learn group participation and presentation skills.

Prerequisites: None

SS101 World History I **5 Periods/wk** **2 semesters** **Level 1-2** **1 credit (Required)**

This is the first course of a three year sequence. History I covers the time period from Paleolithic times to the year 1600. The world's major civilizations during this time period will be covered and their contributions to man's history. Students will also interpret maps and data, read appropriate outside materials as deemed necessary, and develop their research and writing skills.

Prerequisites: Global Studies or ASD Placement Test in Geography

SS201 US/World History II **5 Periods/wk** **2 semesters** **Level 2-3** **1 credit (Required)**

This is the second course of a three year sequence. It covers the years 1600 to 1900 on a global scale, including both World and American history, including themes of emerging nation states and the rise of nationalism. Students will interpret maps and data, read appropriate outside materials, and other material as necessary. Also, as this three year sequence of History courses is designed to become more challenging as the course progresses, students will continue to hone and perfect their research and writing abilities.

Prerequisites: World History I

SS301 US/World History III **5 Periods/wk** **2 semesters** **Level 3-4** **1 credit (Required)**

This is the third and final course in a three year sequence of History courses. It covers the twentieth and twenty-first centuries on a global scale, including World and American History. Major themes discussed will include the role in society of conflict, the changing role of females, and the emerging interconnected world. Students will read appropriate outside materials, including primary documents, and other material as necessary. Students will also continue to perfect their research and writing skills.

Prerequisites: US/World History II

Visual & Performing Arts

1 high school-level credit required for graduation.

ART100 Classical Ensemble **2-4 periods/wk.** **1-2 Semesters** **Level 1-6** **.5 credit**

This course may be repeated if desired since the music studied each semester will be different. Students will play classical music arranged for an appropriate mix of instruments. It is open to students playing woodwind or brass instruments, violin, viola, cello, or bass percussion, and/or keyboards. Students must be able to sight read for the instrument they play. The class does not include jazz, rock or Broadway music. This is a Pass/Fail course.

Pre-Requisites: The ability to read music and be able to play at least 8th notes, with reading and playing of 16th notes preferred.

ART150 Two-Dimensional Art **2-4 periods/wk.** **1-2 Semesters** **Level 1-6** **.5 credit**

This course introduces the fundamentals of drawing and design. Topics of instruction include perspective, observational landscape and still-life drawing, graphic design and painting. Cultural and historical connections are illustrated, although the course emphasis is on the making of art by the students. Students may take this elective for one or two semesters as different topics will be addressed in each semester. This is a Pass/Fail course.

Pre-Requisites: None

Health & Fitness

2 high school-level credits required for graduation which includes .5 credit required for health.

PE103 Physical Education **2 periods/wk.** **1 Semester** **1-6** **.5 credit**

This course includes regular physical activity with a core of fitness and wellness, yoga, track and field and lifetime and team sports. Students refine motor skills and fitness, and practice personal and social competency. By taking this course for two semesters, which can be done in separate years,students may fulfill half of the physical education and health requirement for graduation. This is a Pass/Fail course.

Pre-Requisites: None

PE105 Physical Education Contract **open** **27-54 hours** **1-6** **.5 or 1.0 credit**

Students may partially fulfill the 2 credit physical education and health graduation requirement by participating in fitness programs outside of ASD. These programs must have a duration of at least 9 consecutive weeks, with individual sessions combining for a total of 27 hours of physical activity to earn .5 credits in physical education, or 54 hours of physical activity to earn 1 credit.

Students must write a brief, clearly worded contract describing how the course requirements have been fulfilled. This contract must then be signed by a parent/guardian, the fitness instructor or coach, and the ASD Director. This is a Pass/Fail course.

Prerequisites: None

PE107 Life Management Skills (Health) **5 periods/wk.** **1 Semester** **2-6** **.5 credit (required)**

This course is all about you and the important decisions you make. It's also about having the correct information before making those decisions. We'll deal with real issues like nutrition, substance abuse, coping with stress, and what to do about sex.

Good health is both mental and physical. Making good decisions starts with knowing the facts, understanding the consequences, and having the confidence to choose well. A series of signposts will take you through the course providing information, direction, and a little encouragement. We'll also offer some important tools for communicating your feelings and opinions. We'll even talk about being a savvy consumer in a world of advertising, personal finance, credit cards, and designer blue jeans.

This is a course comes with a long-term payoff. The good decisions you make now will set a positive direction you can follow for a lifetime.

Prerequisites: None

Other

AS100 Computer Literacy & Guided Study **5 periods/wk.** **1 Semester (Fall)** **Level 1** **No Credit (Required)**

This course is intended to ensure that all entering ASD students have a solid skills foundation across a spectrum, including, but not limited to:

- General computer usage, including utilizing the ASD network and computers
- Use of specific applications, including: word processing, spreadsheet, presentation
- Use of keyboard, etc.
- Research, writing essays, writing term papers and general study skills

While the goal is a consistent minimum standard of expertise, not all areas will actually receive course time. For example, while students are expected to be sufficiently proficient at keyboarding by the end, the course time is not for practice. Since students come in with a variety of backgrounds, it is expected individual students may have a variety of different areas that require attention. It is expected this course will cover mechanisms and usage models (e.g. how to construct a presentation, and presentation skills), there will be coordination to have those skills actually demonstrated in the context of other classes (e.g. by having both a history and computer literacy teacher watch a student's presentation to evaluate different aspects.)

Guided study will teach students the necessary skills needed to succeed in high school. Skills taught will include research, writing essays, writing term papers and study skills. Other sections taught will be determined based on the needs of the students.

Areas of Specialization & Inspiration/Electives

2 high school-level credits are required for graduation. We encourage students to take as many classes as they want, can fit into their schedules, and can handle.

Computer Science, System Design, Simulation

CS300 Computing Fundamentals II **5 Periods/wk** **1 Semester (Spring)** **Level 3-6** **.5 credit**

This course builds on computing fundamentals 1, but focuses more on programming. This course will likely use the C++ programming language. Maybe exposure to interpreted language (Perl, Python or Ruby). Expect 2 day lecture, 3 day programming.

Prerequisites: Computing Fundamentals I

CS400 Survey of Computing **5 Periods/wk** **2 Semesters** **Level 4-6** **1 credit**

This is the core shared course for students in the "Computer Science, System Design and Simulation" area. It is intended to provide a broad survey of the subject area, with exploration of a variety of topics. Topics are likely to include: abstraction, algorithms and data structures building on Computing Fundamentals knowledge, computer architecture, programming languages, operating systems, software engineering, human interfaces, databases, artificial intelligence, robotics, networks and the internet, web, wireless communications, logic gates, formal languages, computational complexity, parallelism.
This challenging course is intended to expose students to broad range computer science, computer engineering, electrical engineering and interrelated areas. It is expected that students that have completed this course are prepared to pick an area of individual study for a senior research project related to this focus area. While there may be some programming, this is not a programming course.

NOTE: Will be offered 2011-2012 school year based on eligibility and interest.

Prerequisite: CS300 Computing Fundamentals II

CS301 Web Design I VLACS **5 Periods/wk** **2 Semesters** **Level 3-6** **1 credit**

In this course, students will become a Web Design Intern for a virtual company called Education Designs and learn what goes on under the hood including: Internet basics, HTML, and the file structure of a well-organized web site. Students will learn how to create visually interesting web pages with clear text, complimentary colors, visual assets, and appealing designs. They will also learn how to navigate the Internet to fill a website with useful and well-researched information.

VLACS Course Code: 8207110.

Prerequisites: AS100 or equivalent

CS302 Web Design II VLACS **5 Periods/wk** **2 Semesters** **Level 3-6** **1 credit**

A well-designed skyscraper is an impressive sight. A well-designed website is also an impressive site of another kind - the kind that reveals the advanced skills of a expert designer. This course will take students through the entire construction process from planning, to creating the structure, to adding the final special touches. Students will learn how to create a storyboard or blueprint for their own website, and will learn about website navigation, style sheets, graphic creation, digital image optimization, security, and server hosting. They will also learn how to work in teams, with specific tasks assigned to individual team members. Adobe CS3 products will be used for website creation and management. The purpose of this course is to equip the student to be a master architect, contractor, and manager of a valuable property - property that communicates a message in an impressive way.

VLACS Course Code: 8207120

Prerequisites: CS301 Web Design I

CS501 AP Computer Science A VLACS **5 Periods/wk** **2 Semesters** **Level 4-6** **1 credit**

The AP Computer Science A course is an introductory computer course which involves developing the skills to write programs or parts of programs that correctly solve specific problems. AP Computer Science A also emphasizes the design issues that make programs understandable, adaptable, and when appropriate, reusable. At the same time, the development of useful computer programs and classes is used as a context for introducing other important concepts in computer science, including the development and analysis of algorithms, the development and use of fundamental data structures, and the study of standard algorithms and typical applications. In addition an understanding of the basic hardware and software components of computer systems and the responsible use of these systems are integral parts of the course.

VLACS Course Code: 0200320

Prerequisites: Algebra I Honors and Algebra II Honor

Architecture & Engineering

NOTE: This Area of Specialization & Inspiration is currently under development. No courses will be offered for Architecture for the 2010-2011 school year.

EG300 Survey of Engineering **5 Periods/wk** **2 semesters** **Level 4-5** **1 credit**

This is the core shared course for students in the "Architecture and Engineering" focus area. This challenging course is intended to expose students to computer science, computer engineering, electrical engineering and interrelated areas. It is expected that students that have completed this course are prepared to pick an area of individual study for a senior research project related to this focus area.

Prerequisite: Technology Applications in Society

Chemistry & Bio-medicine

NOTE: This Area of Specialization & Inspiration is currently under development. The course(s) listed below will count toward graduation credit for this Area of Specialization & Inspiration, however course(s) may or may not be offered in the future.

MED400 Medical Terminology VLACS eStart **5 Periods/wk** **2 semesters** **Level 4-6** **1 credit**

A course designed to promote the understanding of the proper use, spelling, pronunciation and meaning of medical terms. This course is designed for the student who is highly motivated, has good organizational and time management skills, self-disciplined and has the ability to adapt to a new learning environment. The course requires the student to have access to a computer with Internet access and a valid e-mail account. E-mail and Internet access and proficiency is required for communication with the instructor, submission of exams and contact with other students participating in the class as desired. The course work must be completed not later than the dates outlined in the course schedule, which is posted on the BlackBoard site.

VLACS/CCSNH Course Code: Medical Terminology

Prerequisites: IBC III

Space, Astronomy & Astronautics

NOTE: This Area of Specialization & Inspiration is currently under development. No courses will be offered for the 2010-2011 school year.

Environmental & Global Sustainability

The Environment and Global Sustainability Area of Specialization takes a systems theory approach to the complex relationships between environmental sustainability, human society, and progress. Building on the 3-year Integrated Biology and Chemistry curriculum, students in this Area of Specialization take Advanced Placement Environmental Science as the foundation course, Research Methods, and at least one Sustainable Energy Design courses toward fulfillment of the 3-credit requirement. Students in this Area of Specialization will be well-equipped for college research opportunities.

ES501 Earth & Space Science Honors VLACS **5 periods/wk** **2 Semesters** **Level 1-2** **1 credit**

This option is available for students who are unable to fit Earth and Space Science course #804 into their schedule or for those students interested in more in-depth study in this area. Topics include the nature of science, general characteristics of the atmosphere and factors that influence weather, oceanography, hydrology and aquifers, the

geology and paleontology of Florida (where the online course originates), archeology, the solar system and astronomy, remote sensing procedures and tools of space exploration. Students must take the VLACS Honors Option for two semesters (segments).

VLACS Course Code: 2001310

Prerequisites: None

BIO400 Environmental Biology Honors **5 periods/wk** **2 semesters** **Levels 4-6** **1 credit**

This course investigates the scientific principles, concepts and methodologies required to understand the interrelationships of the natural world. Students will be expected to identify and analyze the environmental problems both natural and human made, to evaluate the relative risks associated with these problems, and to examine alternative solutions for resolving and/or preventing them. Students will be prepared to take the AP Environmental Science Examination in May.

NOTE: This course will be offered based on interest for the 2010-2011 school year.

Prerequisites: Algebra I Honors and IBC III

CHEM400 Environmental Chemistry **5 Periods/wk** **1 semester** **Levels 4-6** **.5 credit**

This course will examine the important chemical species, both natural and anthropogenic, present in Earth's atmosphere, hydrosphere, and lithosphere. Chemical properties and interactions, as well as their environmental consequences, will be considered.

NOTE: This course will be offered based on interest for the 2010-2011 school year.

Prerequisites: Algebra I Honors and IBC III

ECOL400 Behavioral Ecology **5 Periods/wk** **1 semester** **Levels 4-6** **.5 credit**

This course will investigate the adaptive significance of behavior in an ecological context. We will cover a variety of topics including competition for resources, sexual selection and biotelemetry.

NOTE: This course will be offered based on interest for the 2010-2011 school year.

Prerequisites: Algebra I Honors and IBC III

BIO501 AP Biology VLACS **5 periods/wk** **2 semesters** **Levels 5-6** **1 credit**

Students will use The Biology Place, Virtual Labs, and Biology: Concepts and Connections to complete the AP Biology course. Throughout this course students will be expected to explore many on-line sites, answer questions, reflect on issues and complete lab activities. Topics include cell biology, molecular genetics, organismal biology and behavior, evolution, ecology, and structure and function of plants. The primary emphasis is to develop an understanding of concepts rather than memorizing terms and technical details. This course is fast paced and requires students to have a great deal of self-discipline and motivation. The ultimate goal of this course is to prepare students to successfully take the AP Biology Examination offered in May. Two semesters (segments) are required.

VLACS Course Code: AP Biology

Prerequisites: Algebra I Honors and IBC III

Aeronautics & Aviation

NOTE: This Area of Specialization is under review.

Mathematics & Physics

The Math/Physics Area of Specialization is designed to provide students with the fundamentals of mathematics and physics and the opportunity to study and apply these fields in more depth. Students may elect to focus on taking Advanced Placement courses as upperclassmen, to explore elective course offerings, or to do some combination between the two subjects. The core sequence is designed to allow students to appreciate the interconnectedness of these subjects while gaining an overview of the breadth of these subjects.

MATH501 AP Calculus AB VLACS **5 Periods/wk** **2 semesters** **Level 5-6** **1 credit (Required)**

An interactive text, graphing software and math symbol software combine with the exciting FLVS on-line course delivery to make Calculus an adventure. This course is designed to prepare the student for the AP Calculus AB exam given each year in May. With continuous enrollment, students can start the course and begin working on Calculus as early as spring of the previous year! All AP courses are designed for students who are willing to accept the challenge of a rigorous academic curriculum. Additionally, AP courses are designed to provide students with a learning experience equivalent to that of a college course. Students should be prepared to dedicate time outside the course for reading and studying for the national exam in May. This course requires motivation, dedication and lots of hard work. Two semesters of the AP course are required.

VLACS Course Code: AP Calculus AB.

Prerequisites: Pre-Calculus

Self-Designed Area of Specialization

At the discretion of the school director a student may elect a Self-Designed Area of Specialization. The student will be required to demonstrate that their Self-Designed Area of Specialization is in keeping with the the spirit and vision of the school charter.

Other Electives

SS400 AP US History **5 Periods/wk** **2 semesters** **Level 3-6** **1 credit**

The course is the equivalent of a introductory college level course and is intended to prepare students to take the AP US History exam. The course covers the entirety of American history from the pre-Columbian Native Americans through the events in the Middle East today. The course will have a strong emphasis on writing and interpreting primary and secondary source documents. Students should expect to read a chapter a week and write one essay a week.

Students taking the course will be required to pay AP exam fee and take the AP exam.

This course may be t

EN700 Writing & Research **2-3 Periods/wk** **1 semester** **Levels 4-6** **.5 credit**

This course is an introduction to integrated writing and research designed to prepare students for college-level academic writing across the curriculum. Instruction includes frequent writing assignments, discussion of writing and revision strategies, use of research and library sources and conferences. Writing assignments progress from single to multiple source, culminating in a sustained research project entailing field research, and interview.

Daniel Webster College Course Code: DWC EN 115

Prerequisites: Literature and Composition II and ASD English teacher pre-approval

Stewardship at ASD

General Description and Rationale

Stewardship is a theory that managers, left on their own, will indeed act as responsible stewards of the assets they control. Stewardship is also about community service, which is rooted in the notion of common-unity. What assets can our students control and what do our students have in common at The Academy for Science and Design? Our assets include a specialization in science, mathematics, engineering, and design. Our common purpose is to acquire the knowledge, skills, and attitudes that will foster high achievement and empower us to become leaders in college, career and society. To fully accomplish the mission of The Academy for Science and Design, all graduates are asked to complete a stewardship requirement.

Community service activities are those which students perform to benefit at least one other unrelated person and for which they receive no compensation. In most cases students will be working under the auspices of an organization—town government, school, non-profit organization, hospital, nursing home, or day care. Activities such as babysitting, tutoring or yard or housework to help a friend or neighbor typically do not qualify as community service. Service to benefit for-profit businesses is NOT applied to the requirement.

Requirement

A minimum of 150 hours of community service, earning .5 credit hours, is required of every student for graduation from The Academy for Science and Design. The stewardship may be performed at any time during students' high school career, from the summer before freshman year until the last day of classes in senior year. This includes free blocks at school as well as all non-school times and vacations within the last four years of a student's experience at ASD. Students are strongly encouraged to complete at least 100 hours of service by the end of the sophomore year. The activity format is flexible. Students may elect to engage in a single activity or many activities, over an extended or concentrated period of time. Suggested community service activities and prohibited activities are described below. In addition, each student's advisor will provide guidance in the selection and completion of appropriate community service opportunities.

Documentation of Credit

In order to receive stewardship credit, verification form(s) must be signed by the student's advisor, activity supervisor and parent. (It is highly recommended that the student ask the advisor to sign the verification form before beginning to fulfill the stewardship requirement, to be sure the activity conforms to the stewardship guidelines.) Within two months of completing the activity, the student must turn in the signed verification form to the ASD administration (This applies to every service activity, even if took place at The Academy for Science and Design.) Simply performing the service does not automatically provide the credit!

To validate the completion of stewardship hours, students must keep accurate logs of the hours and assigned tasks completed for their community service credit. This log should be presented to the student's advisor and the student's activity supervisor, (an authority within each non-profit organization for whom the student has worked,) This information should then be documented in the student's electronic portfolio, which will facilitate completion of applications for college and future employment.

The ASD Stewardship Form requires the pre-approval signature of the student's advisor and parent. After service is completed for the pre-approved activity, the student must obtain the signature and comments from the activity supervisor and turn the form in to the ASD school office. Once the 150 hours of community service is verified by submitting completed Stewardship Form(s) to the ASD school office, the required .5 credit will be recorded on the student's ASD transcript.

The verification forms for the stewardship credit are available from faculty advisors or on the ASD Electronic Community (school intranet).

Traditional School-Sponsored Activities

Activities performed which are traditional extra-curricular school activities are NOT applicable. Thus, participation as members in student government, Destination Imagination, Math Counts, and other such clubs or teams are NOT

applicable unless the groups are organizing and/or performing specific community service activities.

Leading an ASD elective is applicable to the stewardship requirement and strongly encouraged as a means of community service. Leadership activities help fulfill our charter school mission and exemplify our common interests and unity.

Charity Walks. A charity walk may be assigned a specific number of service hours for completing the walk, whether or not the student solicits pledges.

Religious or Political Affiliations. In order to be applicable, an activity may not be associated with the rituals, services, or ceremonies of any specific religion, fund raising or proselytizing to support a specific religion or political party or political platform.

Participation (as members or officers) in religious or political party youth groups is NOT generally applicable unless the groups are organizing and/or performing specific community service activities.

Activities Not Eligible for Service Credit (Recap)

- Court-ordered service
- Service for individuals (e.g. friends, neighbors) without an umbrella organization
- Service at for-profit businesses (e.g., law firms, landscape companies)
- Participation in religious rites, services or ceremonies
- Proselytizing or working for a political party or platform
- Fund-raising to support religious institutions (e.g., most rummage sales)
- Traditional extra-curricular activities or electives, unless community service is performed within that activity and/ or the student is leading the elective
- CIT positions at for-profit camps and/or where CITs pay reduced fees to attend

Activities that are Eligible for Service Credit (Recap)

- Teaching an elective at ASD
- Charitable Walk-a-Thons/ Road Races
- Team Coach or Activity Director (as a volunteer off-site; not for an ASD club or extra-curricular activity)
- Tutoring at ASD and/or at a local public, parochial or private school (as long as the student is not providing religious education or proselytizing)
- Providing Tours for ASD visitations by prospective students, guests and/or faculty applicants
- Museum or State House Guide/ Aide
- Hospital, Senior Center or Nursing Home Volunteer
- Recycling or Conservation Projects
- Habitat Preservation
- Participating in a community band, orchestra, chorus or theater which does not charge admission
- Charitable Fundraising or Collection Drives
- Soup Kitchen or Shelter Volunteer
- Animal Shelter Volunteer
- Food/ Clothing Drives (for a charitable organization)

Internship/Mentorship

The internship at the Academy for Science and Design provides invaluable work experience, outside the school setting, prior to high school graduation. The process of applying and securing an internship develops an understanding of the steps involved to successfully gain employment; the transition from the classroom to the workplace develops an appreciation for the application of knowledge to real world problems and solutions.

Through a personalized internship, students have the opportunity to investigate areas of interest and a potential context for further study. The internship should provoke discussion, questions and self-reflection. Obtaining and maintaining a worthwhile internship experience will strengthen a student's college application as they will have personal experience to present in an essay or interview. Ideally, the internship will also provide a context and possibly a hypothesis to expand upon as a senior project. While learning "on the job," students can improve their own professional and inter-personal skills. Internships may offer the student a reference or recommendation for college or a future job. When the internship is completed, students should have a better understanding of the world of work and their own determinants of a personally satisfying career.

General Description and Rationale

Most internships should encompass approximately 100 hours of employment. An approximation of hours permits students to complete the internship during the summer months or during the school year, when Department of Labor laws are more stringent. In addition, the Academy for Science and Design recognizes that potential employers may not have the flexibility to accommodate an intern who requires a pre-determined amount of hours. The type of work expected of the intern, and the potential for positive results from the experience are more important than meeting an hourly requirement from the Academy for Science and Design. The internship should not detract from the student's ability to devote the necessary time for schoolwork, nor should the internship be so brief as to negate the opportunity to learn from the experience.

Most internships are limited to a single worksite over a mutually agreed-upon, continual period of time. However, there may be exceptions made, if the student's performance and/or results will benefit from a change in context or in having multiple worksites. (The details for securing and/or changing worksites for an internship are covered in the section below on "Procedural Guidelines.")

In most cases, a summer internship would involve 10-15 hours per week for about two months; a school year internship would involve 5-10 hours per week for the equivalent of one semester. It is preferable to spread the internship over several weeks, rather accumulating the hours in just two or three weeks of full-time work. The longer experience will foster more opportunity for reflection and greater potential for growth. Internships are generally unpaid, but satisfactory completion of the internship earns .5 credit hours, and is required of every student prior to graduation from the Academy of Science and Design.

Requirement

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Documentation of Credit

There are many different types of internships, all worthy of consideration, depending on the skills, type of work, and situational preferences of the student. There are a growing number of partnerships, which are co-operative arrangements between the ASD student and an employer or training organization; fieldwork, which involves independent research or observing, recording, mapping and interpreting data that may be collected by the intern or by others at a particular worksite; a practicum that requires construction or a project that could be completed independently or in a team; job shadowing, which is common in legal and medical professions; and apprenticeships, which involve training or supervision by a master technician or licensed authority. For a list of the types of jobs available, a student should review one or more of the following free online websites for career guidance and/or employment resources. This is not intended as an exhaustive list, but many of these sites have links to New Hampshire directories, as well as resume-writing and interview tips, and several include special advice for high school or college students seeking internships and/or paid employment.

- Allstarjobs.com
- America's Career InfoNet (acinet.org)
- Bureau of Labor Statistics (bls.gov/k12)
- Campuscareercenter.com
- Careermag.net
- Careerexplorer.net
- Careers.org
- Coolworks.com
- Educationalplanner.org
- Idealist.org
- Jamminjobs.com
- Jobbankusa.com
- Jobweb.com
- Jobsniper.com
- Truecareers.com

Prohibited Activities:

Students are prohibited from performing jobs that have been declared hazardous by federal orders of the Department of Labor. These would exclude internships that involve such activities as driving a motor vehicle, manufacturing or storage of explosives, exposure to radioactive substances, power-driven woodworking, metal-forming machines or hoisting apparatus and more. If there is any doubt about whether or not the internship might be considered as hazardous, the student should check the Youth Employment Law, Chapter 276-A, under Title XXIII, which is cited at www.labor.state.nh.us. This website also contains important information and necessary approval forms for paid and unpaid youth employment.

The New Hampshire Youth Employment Law stipulates that students under the age of 16 are not permitted to work without a certificate, and must comply with special conditions related to the hours and type of employment allowed. Students who have reached the age of 16 , but are younger than 18 years old, are not required to obtain a certificate for permission to work, but do have restrictions on the number of hours they may be employed while they are enrolled in school. When school is in session, 16 and 17 year old students are limited to working no more than 6 consecutive days, and for a total of no more than 30 hours per week. During vacation periods, such students may be employed up to 8 hours per day and for a maximum of 48 hours a week. (Please bear in mind that the Academy for Science and Design does not recommend minimizing the number of weeks for the internship by maximizing the hours per week.)

To protect the student's reputation as a future college student and employee, as well as to keep the Academy of Science and Design free from liability and able to maintain their business partnerships, strict adherence to the Youth Employment Law is required by all ASD interns and carefully monitored by the ASD administration. Any resistance to, or denial of the governing laws for student employment may result in relinquishing permission for the student and/or the employer to participate in the internship program at the Academy for Science and Design.

Procedural Guidelines:

Self-Assessment

An Internship Liaison will be appointed to each tenth grade student by the Director of the Academy. The liaison will help the student access an appropriate assessment tool to determine their interests, values and skills. Students should begin their search for a suitable internship by asking themselves several questions and/or by taking an online career assessment, such as one available from kuder.com, mappingyourfuture.org or from careerkey.org. This information will assist the student in the search for a potential college major and/or a career path to explore through an internship. This will save both the student and a potential employer from wasting time and effort in the application and hiring process. It can also save family financial resources in traveling to college campuses and paying application fees to pursue a field of study that doesn't match the student's interests, values and skills. The internship should be an opportunity to open doors and pave the way for an exciting future in education and in job satisfaction.

In thinking about interests, students should reflect on the experiences they have had both in school and out of school. Students should consider any short course electives taken or lead at the Academy for Science and Design and the main focus of their stewardship. Similarly, students should review their past participation in any clubs, extra-curricular activities, sports or performing art groups. School vacation periods and/or family travel may be another source to examine. Students are encouraged to make a list of the ten activities they have most enjoyed in the last few years and seek any common thread, single content area or central focus that jumps out on the list. While the Internship Liaison may help with this process, the outcome will be largely dependent upon the honest effort that the student applies to reflection and self-analysis.

It is important for the student to consider his/her own values, even though an internship may not be able to provide the ideal work environment that the student seeks. It is still better to know and try to match preferences, than to start in a position that seems most likely to be ill-suited or unpleasant. Characteristics to consider include whether the student prefers to work as a member of a team or prefers to work alone. Does the student seek advice when unsure about an assignment or would the student rather figure something out on his/her own? Do quiet environments make it easier to concentrate or is background noise needed to provide stimulation? Is the student's best work done at a slow, careful pace or under pressure? Is the student's preferred learning style visual, kinesthetic, auditory or, as in most cases, some combination of the three? The Internship Liaison should remind students that the only "wrong" answer to any of these questions is the one that the student assumes is "right," even if it doesn't fit his/her preferences.

Lastly, and most importantly, the student should consider the skills s/he already possesses and the accomplishments s/he has achieved at school, in their community. With help from the Internship Liaison, the student should review his/her school transcript, and analyze leisure activities and social experiences to see if any particular skills stand out as challenges or successes. The student should review instances of how and when his/her leadership has been demonstrated. A list of awards or recognition earned at school, in clubs and/or in extra-curricular activities is also helpful. The student needs to provide candid responses, but not be overly modest. The answers to these questions will provide the information necessary to sell the student to potential employers, as well as to college admission officers. Being able to market oneself is key to obtaining a desired internship or prized college acceptance.

Career Exploration

When students have completed a thorough self-assessment, they should have a good sense of their interests, values and skills. The self-assessment information gathered during a student's sophomore year at the ASD should be reviewed and summarized before the end of that school year. This information will become the foundation for the student's search for a potential internship before, or during their junior year, the basis for writing an effective resume, beginning a college search, and choosing an area of specialization. During their sophomore year, students are asked to choose an area of specialization to guide their selection of top level courses at the Academy for Science and Design and to begin the career exploration process. These areas include, but are not limited to, architecture and engineering, chemistry and bio-medicine, environment and global sustainability, math and physics, aeronautics and aviation, and computer science, systems design and simulation.

Using the results of their self-assessment, students are encouraged to check with their Intern Liaison, their advisor and family friends for suggestions of an appropriate and interesting internship. The search for an internship may begin as early as the end of sophomore year, but no later than the Fall of the student's junior year at the Academy for Science and Design. Every October, the Intern Liaison will check with each ASD junior to insure that timely progress is being made in finding an individual internship that will meet all the requirements for graduation. While the Intern Liaison has a major role in assisting students with this process, due to both the growing enrollment at the Academy for Science and Design and the time constraints of working within a school schedule, students must assume some responsibility for finding and

securing an appropriate internship. Students who take greater responsibility for obtaining their own internship may also have a greater sense of independence and maturity, which are positive characteristics for college interviewers and future employers.

For an insight into the variety of possibilities for an internship, students should check the New Hampshire Department of Labor website, (www.labor.state.nh.us.) The NH DOL maintains a regularly updated list of over 1,000 pre-approved worksites for paid and unpaid youth employment. Many public libraries also have a career or education center that can help. In addition, there are also internship guidebooks, (Peterson's Internships, The Best 109 Internships and The Internship Bible,) which include suggestions for high school students, (although students should first check for a recent publication date before relying on any textbook reference.)
The best option for some students, who know where they'd like to do an internship, is to call the company or business directly. Even if the worksite has never had a high school intern before, a student can be very convincing with a clear and concise statement of their own qualifications, interests and passion for the type of work being requested. The Internship Liaison can also assist with this process, whether or not the student has chosen a preferred worksite. Regardless of who makes the initial contact for an internship, it is the student's responsibility to follow up any telephone inquiries with a cover letter and resume as explained in the next section.

The Resume

The next step is to write an effective resume. A one-page summary of the student's education, skills, accomplishments, extra-curricular activities, community service and leisure-time interests is key to getting an interview. Professional resume writers often advise job seekers to use action words and phrases. Instead of saying, "I was elected to be student council president," write, "Elected student council president." It is also advisable to include an objective, stating how the student's qualifications will benefit the employer and/or the individual's research project. For example, a student might say, "Objective: To use my technical skills to learn multiple uses for your product offering." The resume should sell your skills and marketability.

If the resume is poorly organized, contains any misspelling or omits vital contact information, it is likely to be ignored. According to the College Board's advice on the best preparation for the work world, a recent survey of employers found that communication topped the skills they looked for most. Students should allow time to have their resume reviewed by the Intern Liaison, a teacher, an advisor and/or a peer. Final copies should be printed on good quality paper and, if sent as an electronic attachment, specialized formatting should be reduced to a minimum.

A cover letter must be included each time the student sends a resume to a different prospective employer. The cover letter should personalize the introduction of the student, explaining why an internship at this particular jobsite will benefit both the student and the employer. It should note how past accomplishments will be relevant to the current position and that the student has what it takes to have a successful internship at this site. As with the resume, proper editing is crucial.

Forms and Written Requirements

Once the student has a potential worksite in mind for the internship, a series of forms must be completed for approval. Some of the forms originate from and must be returned to the New Hampshire Department of Labor; others are required by the Academy for Science and Design. Copies of all necessary forms are on the ASD Electronic Community, although those from the Department of Labor may be printed or completed directly on their website. In some cases, a copy of the student's birth certificate and/or social security number may also be required by the potential employer or by the Academy of Science and Design for validation of the intern's current age and/or citizenship.

If the potential worksite for the intern does not appear as pre-approved on the New Hampshire Department of Labor website (www.labor.state.nh.us,) the business or company must be pre-screened for safety compliance consideration by the Department of Labor. Although the Intern Liaison can assist with any required paperwork, it is the student's responsibility to check to see if the desired worksite is pre-approved. When pre-approval regulations are satisfied, the student provides the information to the Intern Liaison to start the NH DOE Approval Form for Non-paid Work.

Students under the age of sixteen must typically file a Certificate of Youth Employment. However, the laws do not require this form for students involved in approved school-to-work curricula under RSA 279:22-aa, which exempts the interns from the Academy for Science and Design from this requirement, as long as they are completing their internship. If other paid or unpaid employment is requested by an ASD student under the age of 16, unless in the work is performed as community service, the requirements to obtain a Certificate of Youth Employment must be met. Either the Intern Liaison or ASD office personnel can assist students under the age of 16 in obtaining, completing and returning the necessary paperwork. Further information about the requirements and the exemptions related to the Certificate of Youth Employment

can be found on the New Hampshire Department of Labor website.

In accordance with RSA 276-A: 4, VIII, no 16 or 17 year old students are permitted to work without prior written parental permission. The parental permission form includes the worksite name and location, the date of parental signature, the title of the position the minor will fill, and the minor's date of birth. The Academy of Science and Design also requires the anticipated days and hours of employment to be written on the form and, if necessary for the intern to leave school during the normal school day, parents must also authorize the student's form of transportation to and/or from the worksite. The Intern Liaison signs this form, once the parental permission portion is completed, and maintains all related paperwork, (including copies of any forms sent to the NH Department of Labor,) until the student graduates from the ASD.

During the internship, the student is required to keep a log of regular entries. The Intern Liaison may ask to view the log at any point during the internship and/or before the student's graduation. It is strongly advised that students write a minimum of 2-3 narrative paragraphs for every 5-10 hours completed during their internship. Remarks may include descriptions of the work assigned, discoveries of connections between school and work and/or product summaries of work that has been challenging and/or easy to accomplish. These reflections should be included in the student's electronic portfolio, as well as any products that the student is allowed to retain from their internship experience. This information will provide invaluable data for the senior project and help jog student memories when writing college essays or interviewing for admissions or future employment.

The goals of the Internship requirement are for ASD students to gain experience with meaningful employment, develop an appreciation for the application of schoolwork to real world problems and solutions, and to provide a possible context and hypothesis for a senior research project. If these goals are approached with a thoughtful and enterprising spirit, they will be successfully accomplished and greatly enhance a student's potential for entering the college and career of their choice.

Senior Research Project

NOTE: The Senior Research Project is under development.

General Description and Rationale

Requirement

Documentation of Credit