HEBREW ACADEMY
RABBI ALEXANDER S. GROSS
ETERNAL WISDOM FOR A CHANGING WORLD

Science Department Overview 2009-2011

Science Department Head – Dr. Theodore Nusbaum

"The world looks so different after learning science. There are many beautiful things and the content of science is wonderfully full of them. They are very inspiring and they can be used to inspire others."
-Richard Feynman

The R.A.S.G. Hebrew Academy's science curriculum parallels the *National Science Education Standards* with the intent to prepare our students to succeed in a world that is increasingly dependent on science and technology. Life in our society continuously presents us with problems that require scientific information and scientific ways of thinking and we believe that a thorough understanding of science offers personal fulfillment and promotes self-esteem. Science comprehension enhances the capability of all students to master further academic studies and hold meaningful and productive jobs in the future. Personal and professional success is attainable for every student who graduates with an enthusiasm for learning and the ability to reason, think creatively, make decisions, and solve problems.

Science is an active process and students learn by actively engaging in inquiry-based activities that stimulate critical thinking skills and deductive rationale. Classrooms are learner-centered and student driven and the instructional design is research-based. Professional development is essential to continual growth and our science teachers regularly attend workshops, seminars, and summer institutes in various areas of science education.

Our departmental goals underscore the *National Science Education Standards*[*] and enable students to:

- Experience the richness and excitement of knowing about and understanding the natural world;
- Use appropriate scientific processes and principles in making personal decisions;
- Engage intelligently in public discourse and debate about matters of scientific and technological concern; and
- Increase their economic productivity through the use of the knowledge, understanding, and skills of the scientifically literate person in their careers.

* http://www.nap.edu/html/nses/html/

FRESHMAN | SOPHOMORE

In our freshman and sophomore years, two tracks are available for each course offering, an honors course and a grade level course. The freshman course offering is Biology and the sophomores take Chemistry.

GRADE LEVEL BIOLOGY 9th GRADE

This course introduces the basic principles and concepts in Biology. Emphasis is placed on the study of life, the continuity of life, and the relationship between living organisms and the environment. Students will explore the concepts of evolution and biodiversity. Also, the students will recognize the importance of the animal and plant kingdoms and understand how the incredible diversity of animals and plants in both anatomy and physiology allows them to occupy a tremendous variety of habitats. Furthermore, the students will learn about the human body. They will distinguish between the major systems of the human body, identify the parts and functions of each system, and analyze how the systems interact with each other in order to sustain life.

HONORS BIOLOGY 9th GRADE

Honors Biology is a comprehensive survey of general life science that includes biochemistry, cellular biology, molecular genetics and heredity, biotechnology, organismal diversity, structure and function of organisms including human anatomy/physiology, and ecology and evolution. The course textbook, interactive website and laboratory activities will provide for a dynamic, thought-provoking course which will help students to experience science, rather than memorize it. This course provides the pre-requisite knowledge needed for continued studies in life science, either at the Advanced Placement or college/university level.

GRADE LEVEL CHEMISTRY 10th GRADE

This is an introduction to the study of the properties and changes in matter. Course emphasizes topics such as: classification of matter, chemical shorthand, structure of atoms and compounds, the mole, chemical reactions, solids, liquids, and gases. A special section on nuclear chemistry is included. Problem solving skills will be taught and reinforced with an emphasis on experimental design and data analysis.

HONORS LEVEL CHEMISTRY 10th GRADE

The structure and behavior of matter will be approached both quantitatively and qualitatively with particular emphasis on the development of critical thinking skills. This course begins with the expansion of problem solving techniques using dimensional analysis, continues with the conceptual development of modern atomic theory, develops a framework based on the periodic table, and then proceeds with a microscopic description of the structures of atoms and molecules, including a description of electronic orbitals and their relationship to chemical properties. The properties of gases, liquids, and solids will be covered, along with a qualitative description of phase equilibrium. Other topics covered are chemical equilibrium, thermochemistry and thermodynamics, reaction kinetics, electrochemistry, and nuclear reactions. Laboratory investigations play an integral role in the learning process.

JUNIORS | SENIORS

Our upperclassmen are divided into three tracks, Grade Level, Honors, and Advanced Placement. Over the course of two years our Grade Level offerings will be Environmental Science, Anatomy and Physiology and Nutrition. Our Honors track will be able to take Physics and Environmental Science and our Advanced Placement science offerings will be AP Chemistry and AP Biology. If there is enough interest and our schedule allows, we will also offer AP Environment Science as an alternative to AP Chemistry.

HONORS ENVIRONMENTAL SCIENCE

This course is an upper level science course. Environmental Science is a multidisciplinary field that draws from all the sciences in addition to other fields. This course will help students better understand the relationship between humans and the world in which we live. Environmental Science applies the principles of pure Sciences such as biology, chemistry, ecology, geology, and others.

ENVIRONMENTAL SCIENCE

Environmental Science will challenge students to think about their beliefs, their attitudes, and their behaviors, and how these affect our individual responsibility for the environment. Students should have successfully completed Biology before taking this course.

MARINE BIOLOGY

This course concentrates on marine wildlife and marine habitats. It provides a survey of members of each biological kingdom that live in marine environments as well as the physiological processes and structures that help them live in such environments. It then discusses how these creatures and their physical surroundings form marine ecosystems such as estuaries and coral reefs. In order to take this course, students must have completed a first-year biology course,

NUTRITION

This course covers the range of contemporary nutrition including the physiological and practical aspects of obtaining a healthy diet. Students in this class will explore the relationship between nutrients, health, and well being. The course will implement a variety of teaching methods and activities that will enable students to evaluate and think critically about current nutritional issues and controversies.

ANATOMY AND PHYSIOLOGY

This course introduces students to the normal development, structures and functions of the human body. Students will examine the physiological components of the human body in order to obtain understanding of how the structures and functions of the body are related. Emphasis will be on the major body systems, from the nervous system to the reproductive systems. The unifying themes of the interrelationships of body organ systems, homeostasis, and the complementary nature of structure and function, will provide the basis of understanding the workings of the human body.

HONORS ENVIRONMENTAL SCIENCE

This course is an upper level science course. Environmental Science is a multidisciplinary field that draws from all the sciences in addition to other fields. This course will help students better understand the relationship between humans and the world in which we live. Environmental Science applies the principles of pure Sciences such as biology, chemistry, ecology, geology, and others.

HONORS PHYSICS

Honors Physics is an introductory course that is intended to provide high school students with the study skills, knowledge base, and analytical thought processes that can be applied in all areas of academic study. The laws and behavior of the physical universe will be approached both quantitatively and qualitatively with particular emphasis on the development of critical thinking skills. This course begins with an in-depth study of Newtonian mechanics to develop a fundamental understanding of the laws of motion and the properties of forces. After developing a concrete understanding of motion and forces, the class will explore the following topics: fluid mechanics and thermal physics; waves and optics; electricity and magnetism; and atomic and nuclear physics. Problem sets and quizzes will be assigned regularly to ensure that students are keeping up with the course objectives. It is the responsibility of each student to keep up with the text readings and laboratory assignments.

ADVANCED PLACEMENT BIOLOGY

Advanced Placement Biology is designed to be the equivalent of a two-semester college biology course in its quality and sophistication. This course will contribute to the development of the students' abilities to think clearly and to express their ideas, orally and in writing, with clarity and logic. Curricular content surveys the following levels of biology in considerable depth: biological molecules, cellular structure and function, biochemistry of energy transformations in cellular respiration and photosynthesis, mechanics of mitosis and meiosis, genetics, molecular biology, biotechnology, evolution (macro and micro), anatomy and physiology of plant and animal systems, and ecology. As the mechanism that accounts for both the unity and diversity of life, the theory of evolution binds the principles of life science together and this theme echoes throughout the curriculum.

ADVANCED PLACEMENT CHEMISTRY

Advanced Placement Chemistry is designed to be the equivalent of a general chemistry college course in its quality and sophistication. This course will contribute to the development of the students' abilities to think clearly and to express their ideas, orally and in writing, with clarity and logic. This course begins with the conceptual development of the atomic- molecular theory, develops a framework based on the periodic table, and then proceeds with a microscopic description of the structures of atoms and molecules, including a description of electronic orbitals and their relationship to chemical properties. The properties of gases, liquids, and solids will be covered, along with a quantitative description of phase equilibrium. Other topics covered are chemical equilibrium, thermochemistry and thermodynamics, reaction kinetics, electrochemistry, nuclear reactions, and organic chemistry. Problem sets and weekly quizzes will be given to help pinpoint problem areas. Emphasis will be on chemical calculations, application of mathematical

formulation of principles, and hands-on laboratory experimentation. Students are required to complete the summer assignments (summer reading and problem set) and submit written analyses from current periodical publications throughout the year.

ADVANCED PLACEMENT ENVIRONMENTAL SCIENCE

This course is designed to acquaint the student with the physical, ecological, social, and political principles of environmental science. The scientific method is used to analyze and understand the interrelationships between humans and the natural environment. This course shows how ecological realities and the material desires of humans often clash, leading to environmental degradation and pollution. Course chapters are divided into several subsections, each of which contains text, animations, laboratory simulations and video presentations by experts.

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Mathematics Department Overview 2009-2011

Department Coordinator – Mr. Charles Innes

FRESHMAN | SOPHOMORE | JUNIOR

The mathematics program is designed to meet the needs of each student. This goal is accomplished by offering a variety of courses on each grade level, by keeping classes small enough to allow for individual attention, and by making available opportunities for remediation and enrichment. Standards are higher than those required by the Florida Sunshine standards. Every student is required to take math for a minimum of four years so that he/she is prepared to do advanced work in mathematics and to succeed on nationwide achievement tests and competitions. Calculators and computers are integrated with traditional topics in all courses.

Beginning in freshman year, at least two levels of courses are offered for each grade-an honors course and a grade level course.

THE HONORS PROGRAM
Students selected for this program have exhibited exceptional talent in mathematics, have achieved high scores on standardized exams and have been recommended by their teachers. The courses that they take present the traditional courses in an enriched, rigorous and sophisticated way. Their course of study includes Geometry and Algebra II in the ninth or tenth grade and Pre-Calculus in grade eleven. These students are eligible for AP Calculus, either AB or BC, during their senior year.
GRADE LEVEL PROGRAM
Students in this program take Algebra I in ninth grade, Math l0 (Geometry) in tenth grade and Math 11 (Algebra II) in eleventh grade. Students in this program can elect to take Pre-Calculus in their senior year. There will also be another Math offering for students in the senior year for those seeking a more practical

math course that focuses less on Mathematic theory. Currently we are offering Nutrition as a Florida Sunshine standard math alternate for seniors. In 2011 we hope to offer Finance.

MATH 9
The traditional course in Elementary Algebra encompasses a study of the real number system, solution of linear and quadratic equations in one variable and associated verbal problems, solutions of systems of equations in two variables, linear functions, and operations with algebraic expressions. Emphasis is placed on problem solving.

MATH 10
A unit in symbolic logic introduces the students to the structure of a deductive proof. The course then proceeds with the traditional focus on geometry that teaches the nature of a postulation system, how to write a formal proof, and how to solve numerical problems based on applications of theorems. Trigonometry of the right triangle is introduced.

MATH 11
The traditional course in Intermediate Algebra and Trigonometry begins with a review of Algebra I and extends the student's knowledge to complex numbers. Logarithmic, exponential and trigonometric functions are studied. Graphs of these functions and the conic sections are introduced. Calculators are used extensively to allow students to focus on concepts rather than computation.

PRE-CALCULUS/MATH 12
This course develops a thorough understanding of functions, their properties and their graphs. Particular attention is paid to natural number, polynomial, trigonometric, exponential and logarithmic functions. Graphing calculators are used extensively in the explorations of these functions and their applications. Probability, matrices, statistics and mathematical modeling are other topics dealt with during the year.

CALCULUS

The study of calculus opens up a whole world of interesting problems. The limit, derivative and anti-derivative allow students to solve important problems such as finding instantaneous rates of change and the area under the curve. These quantities are useful in a myriad of engineering, physics, biology, chemistry and business applications.

This course introduces limits, differentiation, and integration of functions. Students will find and evaluate finite and infinite limits graphically, numerically, and analytically. They will find derivatives using a variety of methods including the chain rule and implicit differentiation. They will use the first derivative test and the second derivative test to analyze and sketch functions.

Subsequently, students will find anti-derivatives using a variety of methods including substitution. They will evaluate integrals using a variety of methods including numerical integration. They will understand and apply Riemann sums, definite integrals, and the fundamental theorem of calculus. In particular, they will differentiate and integrate logarithmic, exponential, and inverse trigonometric functions. They will solve simple differential equations that can be solved by separation of variables and use them to solve applied problems. They will use integration to determine the area between two curves, volume, and surface area. Finally, they will apply integration to determine work, center of mass, and fluid force.

AP CALCULUS AB

AP Calculus AB is equal to a college-level course covering derivatives, integrals, limits, approximation, and applications and modeling.

FINANCE

This course is designed to teach students the importance of managing their personal finances, allowing them to excel in everyday life. The basic mathematical concepts in part one help the student to review and practice math skills. In part two of the course, the student will learn personal finance that utilizes money management skills, the calculation of income, paying taxes, recordkeeping, checking and savings accounts, credit, mortgage payments and investing.

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Social Studies

CURRICULUM SCOPE AND SEQUENCE FOR 2009-2010
Department Head – Mr. John Morse

Course Descriptions
The Hebrew Academy requires that each student successfully complete four years of high school social studies.

FOUNDATIONS OF CIVILIZATION: GRADE 9

Course Description: World History is designed to provide students with the analytical skills and factual knowledge necessary to deal with the problems and progress of world history. As this is truly a global history of humankind, the school has opted to invest *two years* of resources to ensure the entire scope of human history. Students learn to assess historical materials—their relevance to a given interpretive problem, their reliability, and their importance—and to weigh the evidence and interpretations presented in historical scholarship. The introductory course for Grade 9 covers the foundations of history through the Reformation.

CONTEMPORARY WORLD HISTORY: GRADE 10

Course Description: This course continues the study of world history begun in the freshman year. The course commences with the first truly global age as the European nations begin expansion and concludes with the collapse of the Soviet Union, the New World Order, and the threat posed by terrorism.

UNITED STATES HISTORY: GRADE 11

Course Description: United States History is a comprehensive full-year course that begins with settlement and colonial America and continues chronologically through to the 21st Century.
Students are required to take a half year course on Zionism and a half year course on Holocaust.

GRADE 12

In the 12th grade our students are required to complete a half a credit of American Government and a half a credit of Economics. These courses are offered at the grade level and honors level. Students who meet the necessary requirements can take these two courses on the college level offered either at our campus or at Touro College South. Students can choose to take Psychology as and elective in their senior year. This course can also be taken on a college level, as can International Relations through a tutorial with Touro South College.

AMERICAN GOVERNMENT

Course Description: American Government is a semester survey course designed to provide an understanding for the nature of limited government and checks and balances, the operation of the federal system, as well as to provide an overview of the national and state governments and to encourage participation in those governments.

ECONOMICS

Course Description: Economics is a semester senior course that aims to provide an overview of and ensure basic comprehension of the American economic system.

PSYCHOLOGY

Course Description: This course covers the basic concepts of psychology including the development of personality, emotions, motivation, and perception. Students learn about the many influences that may affect human behavior.

INTERNATIONAL RELATIONS

Course Description: This tutorial course is run in conjunction with Touro South College and has a prerequisite of selection to the Model Untied Nations competitive team. The goal is to provide a survey of political theories and models that operate in use and attempting to cope with global problems. Students are given lectures in not only theory, but diplomacy, UN operations, human migration, and decision making. Students practically demonstrate learned material writing position papers and through debate.

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English Department Overview 2009-2011

Department Chair – Mrs. Ellen Averbook

Every high school student is required to take English each year. The English program during the four years of high school consists of different courses offered at grade, honors and AP levels. English I, a ninth grade course, concentrates on general English. Students study all different genres of literature, with an emphasis on grammar and writing skills. Additionally, all freshmen are required to take a nine week writing course. English II, a tenth grade course concentrates on American literature. Students in English III (11th Grade) and English IV (12th grade) take one year of British literature and take one year of World literature.

THE AP PROGRAM

Students must be recommended by their teachers and take an entrance test to qualify for AP Language and Composition and AP Literature and Composition. It is an extremely intense reading and writing course and the students must take the AP exam at the end of the course.

THE HONORS PROGRAM

Students selected for this program have exhibited exceptional ability in reading comprehension, and writing skills. To enter this program students must be recommended by their teacher and achieve high scores in their classes and on standardized tests. The honors level courses enable the students to study English literature and composition on a sophisticated and rigorous level.

GRADE LEVEL PROGRAM

Students in this program take English I in ninth grade, English II-American literature in tenth grade, English III-IV – British Literature and World Literature in eleventh and twelfth grades. Grammar and writing skills are greatly emphasized in each grade to ensure students are proficient in writing and analyzing literature.

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FOREIGN LANGAUGES OVERVIEW

SPANISH

Course Instructor – Mr. Geoff Harte

Spanish I – Grade 10

Course Description

Spanish 1 has been carefully designed to meet the standards of the American Council on the Teaching of Foreign Languages (ACTFL). These standards call for a method of teaching that focuses on successful communication through speaking, writing, reading, and listening, as well as a thorough grounding in aspects of culture. Unit activities blend different forms of communication and culture to ensure that the student meets all standards.

Course strategies include warm-up activities, vocabulary study, reading, threaded discussions, multi-media presentations, self-checks, practice activities and games, oral and written assignments, projects, quizzes, and exams. Learning activities in each unit are focused upon a specific theme.

Spanish II – Grade 11

Course Description

Spanish 2 has been carefully designed to meet the standards of the American Council on the Teaching of Foreign Languages (ACTFL). These standards call for a method of teaching that focuses on successful communication through speaking, writing, reading, and listening, as well as a thorough grounding in aspects of culture. Pre-requisite Spanish I. Unit activities blend different forms of communication and culture to ensure that the student meets all standards. Course strategies include warm-up activities, vocabulary study, reading, threaded discussions, multi-media presentations, self-checks, practice activities and games, oral and written assignments, projects, quizzes, and exams. Learning activities in each unit are focused upon a specific theme.

Spanish III – Grade 11/12

Course Description

Spanish 3 has been carefully designed to meet the standards of the American Council on the Teaching of Foreign Languages (ACTFL). These standards call for a method of teaching that focuses on successful communication through speaking, writing, reading, and listening, as well as a thorough grounding in aspects of culture. Each unit embodies all of these standards in accordance with the theories described in this document. Unit activities blend different forms of communication and culture to ensure that the student meets all standards. Course strategies include warm-up activities, vocabulary study, reading, threaded discussions, multi-media presentations, self-checks, practice activities and games, oral and written assignments, projects, quizzes, and exams. Learning activities in each unit are focused upon a specific theme. The student will continue to sharpen listening; speaking, reading and writing skills through activities that are based on pedagogically proven methods of foreign language instruction. Throughout the five units of material, students learn to express themselves using an ever-increasing vocabulary, present-tense verbs, past-tense verbs, articles, and adjectives. Grammar is introduced and practiced in innovative and interesting ways with a variety of learning styles in mind. Pre-requisite Spanish II.

Culture is sprinkled throughout the course in an attempt to help the learner focus on the Spanish-speaking world and their culture, people, geographical locations and histories.

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Hebrew Language Department Head – Mrs. Meirav Kravetz

The Hebrew Academy uses the NETA curriculum for its Hebrew Language programming. Each Student is required to take a minimum of 3 credits of Hebrew Language. The NETA curriculum is linguistically sequential; texts and tasks increase in length and complexity as the student's Hebrew improves. Lessons are centered on themes of interest, ranging from computers and sports to friendship and freedom. Each theme is presented from three perspectives: Jewish tradition, modern Israeli culture and general world knowledge, including art, science, mathematics, literature and philosophy. Each unit of study incorporates art, music, prose, poetry, news articles and Jewish texts, in layers of language ranging from biblical Hebrew to current scientific Hebrew terminology and common colloquialisms. The curriculum specifies clear goals and measures of achievement, and is accompanied by standardized tests written by the curriculum development team and educational evaluation experts.

Prior to entering the program, each student's level is determined by a multiple-choice placement test. Depending on the level of the course students can receive credit at the grade level, honors or advanced. Students taking the SSAT II in Hebrew Language can exempt themselves form the Hebrew Language requirement.

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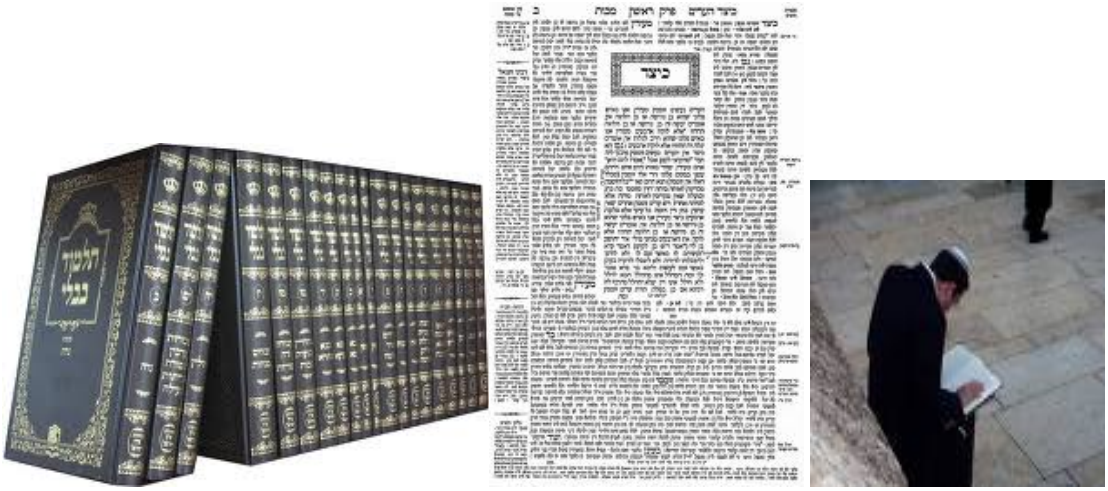
Talmud Overview
Talmud Department Chair- Rabbi Dovid Wechsler, M.A.



Talmud

Talmud is the quintessential text of the *Torah Sheb'al Peh*, "The Oral Law." Its study has been the mainstay of Judaism for over two thousand years, from generation to generation until today. Talmud (or Gmara as it is often referred to) offers students an opportunity to delve into the subject matter both intellectually and spiritually. The ultimate goal of the Talmud curriculum is for students to develop into self learners. This lofty goal is primarily reached by engaging students with relevant, exciting and intellectually stimulating sections of Gmara. Students learn to appreciate and value the study of Torah in general and Talmud in particular.

This boys' class is called Talmud *Biyun*. *Biyun* is translated as "in depth," and it refers to the analytical questioning and understanding of the Talmud. The class is offered in two tracks; an honors and regular grade level and students are placed in the level that best suits their ability. All students are taught to be familiar with the basic setup of the *Daf*, a page of Talmud. Although most students have already had this background from middle school, it is a skill that is continuously reinforced throughout high school. Additionally, as the years progress, the students are introduced to more commentators that are referenced to or relate to the Gmara.

Ninth and Tenth Grade

During the ninth and tenth grade, the focus is on Gmara vocabulary, key phrases, Talmudic concepts and the ability to read and understand the sequence of the text. The commentators that are taught are primarily used to help understand the topic, see its relevance or to train critical thinking.

Eleventh and Twelfth Grade

In eleventh and twelfth grade, the above skills are built upon and increased. There is also more of a focus on becoming an independent learner. Students are given more time to study with a *chavruta* or partner and they begin to prepare sections on their own and research the appropriate commentators. There is a significant amount of critical thinking in the classes and the objective of a Halachaic conclusion is often reached.

Bekiut

Another highlight of our Talmud curriculum is the elective class of *Bekiut. Bekiut* refers to a fast paced study of Talmud where the focus is on content and not the analytical skills and vocabulary that is focused on in the *Biyun* class. Although these skills are also improved through the study of *Bekiut*, the ultimate source of pride is at the end of the year when the objective is reached and an entire Tractate is completed. This is a feat accomplished only in the finest of institutions and is done through the extra time and effort that is invested. For the past four years, we have participated in the Yeshiva Universit Bekiut program that links together several schools throughout the country to study the same Tractate and take tests during the year. Our students who have chosen to take the tests have consistently scored high and are on par with the rest of the country.