

*Exemplar Scholars Program*



An Institute for Excellence in Math, Science, and Technology

***2012-2013***

## ***The Exemplar Scholars Program***

### ***An Institute for Excellence in Math, Science, and Technology***

In addition to its advanced academic path, the Lexington Catholic High School Exemplar Scholars Program is designed to take our most talented math, science, and technology students and expose them to a wide range of experiential opportunities. In doing so, the intent of the program is to allow our most gifted math and science students to experience research and mentorship opportunities at an unprecedented level.

Given this goal, the Exemplar Scholars Program includes an academically rigorous curriculum that will require its students to earn additional credits above the minimum 25 credits required to graduate.

Additionally, students will be provided opportunities to conduct research as well as job-embedded mentorships within areas of personal and career-related interest.

Upon completion of their mentorships, Exemplar Scholars will be required to present their research in the form of a Senior Research Project designed to demonstrate knowledge and skills gained while in the program.

While the Exemplar Scholars Program is initially dedicated as a Math, Science, and Technology program, we intend to expand this program into the areas of Liberal Studies and Fine Arts.

Importantly, the coursework for the program will not be restricted to Exemplar Scholars exclusively; rather, any student can participate in some of the classes along with the Exemplar students thus enhancing the overall quality of the student body.

All these are accomplished under the guidance and supervision of Teri Harper, Director of Exemplar Scholars.

#### ***Program Highlights Include:***

- Highly Selective Admissions Process
- Increased Academic Rigor
- Job Embedded Mentorships
- Research Opportunities
- Senior Research Project

For more information contact Teri Harper: (859) 277-7183 ext. 239 or [tharper@lexingtoncatholic.com](mailto:tharper@lexingtoncatholic.com)  
Applications and additional course descriptions available at: [www.lexingtoncatholic.com](http://www.lexingtoncatholic.com)

**PROGRAM OF STUDIES**  
**Math/ Science/Technology Major**

SUBJECT	CREDITS REQUIRED	FRESHMAN YEAR	SOPHOMORE YEAR	JUNIOR YEAR	SENIOR YEAR
RELIGION	4	1 credit	1 credit	1 credit	1 credit
ENGLISH	4	Hr. Survey	Hr. American	Hr. British or AP Literature or AP Language	AP Language or AP Literature
MATHEMATICS	4	Hr. Geom or Hr. Alg II or Honors Trig.	Hr. Alg II or Hr. Trig & Precal	Hr. Trig & Precal or AP Cal AB	AP Calculus AB or AP Cal BC
SCIENCE	5 or 6	Hr. Biology and Hr. Geophysical	Hr. Chemistry	AP Chemistry	AP Physics B or C (required); AP Bio (recommended)
MENTORSHIP / RESEARCH	100-150 Hours		Assigned to a Project 2 <sup>nd</sup> Semester Sophomore Year & Start Mentorship / Research	Conduct Mentorship / Research	1 <sup>st</sup> Semester: Finalize Mentorship / Research; Jan/Feb: Senior Presentations
SOCIAL STUDIES	3.5		AP World History	AP U.S. History and .5 Economics (or take Econ online)	AP Government
WORLD LANGUAGE	2	1 credit	1 credit		
COMPUTER	1	Computer Apps (.5)	C++ (.5) or JAVA (.5)		
FINE ARTS	1		Suggested for Rising Sophomore: Summer School or Online		
HEALTH & PHYSICAL EDUCATION	1	Suggested for Rising Freshmen: Summer School and/or Online			
ELECTIVES	1				

## **Exemplar Scholars Program of Studies**

Exemplar Scholars Program is designed to challenge academically gifted students in the area of math, science, and technology. Freshman scholars will be placed in Honor Biology, followed by Honors Chemistry, Advanced Placement Chemistry, and seniors will finish the program with Advanced Placement Physics B or C. It is highly recommended that they also take AP Biology their senior year.

### **Honors Biology**

This honors course is designed to challenge the student. It emphasizes critical thinking and application of concepts. Students are expected to be capable of independent work and will be required to cover the same core concepts covered in Biology I but at a much faster pace and in greater detail.

### **Honors Chemistry**

Chemistry is the study of matter/energy and the changes that occur as substances interact. Topics within the course of study include, but are not limited to: atomic theory, nomenclature, VSEPR Theory, reaction classification and product prediction, stoichiometry, thermodynamic principles, chemical kinetics, reaction rates and mechanisms, acid-base interactions, and nuclear chemistry. Material and concepts presented are more in-depth and interrelated when compared to Chemistry I; the course is a preparatory course for students interested in entering a college chemistry course and/or AP Chemistry. Students entering the course should be proficient in algebra and scored well in the chemistry section of geophysical science. Laboratory experiences are designed to reinforce or introduce concepts presented within the class lecture/discussion.

### **Advanced Placement Chemistry**

The AP Chemistry course is designed to provide an educational experience within the field of chemistry equivalent to a first year college chemistry course. The advantages of such a course include the possible fulfillment of a science credit for those students pursuing a collegiate major that does not require chemistry; for those students pursuing a major requiring a first year chemistry course, AP Chemistry may be substituted for a laboratory requirement. Even if the student does not receive college credit for the course, the rigor and depth of subject knowledge will better prepare the student for the first year college chemistry course. While many of the same topics are covered in the Honors Chemistry course, the concepts and principles are reinforced, presented in a more in-depth manner, and in a more varied, cross-discipline manner. Laboratory experiences are designed to reinforce or introduce concepts presented within the class lecture/discussion.

### **Advanced Placement Biology**

This is a lab-based, second year course which prepares students for the national AP Biology exam given during the second week of May. This exam tests a student's ability to explain, analyze and interpret biological processes and phenomena. The syllabus is a compilation of topics covered by 300 colleges belonging to the College Board. Topics include biochemistry, cells, energetics, heredity, molecular genetics, evolution, diversity of organisms, structure and function of plants and animals and ecology. These topics are covered in depth and at the pace of a college-level course so there is a good deal of independent work and out-of-class study time required. A college textbook and lab manual are used.

### **Advanced Placement Physics B**

AP Physics B is an Algebra-based physics course. This is primarily a lecture/discussion course with an emphasis on laboratory and problem-solving skills. The course discusses topics in motion, force, energy, momentum, circular motion, harmonic motion, fluid dynamics, thermodynamics, electricity, magnetism, optics and modern physics. The curriculum is equivalent to the old Honors Physics course but students will take the AP exam in addition to receiving the AP grade multiplier. AP Physics B is recommended for students who wish to pursue pre-medicine, pharmacy or engineering in college. This course utilizes a college level textbook and is classified as a lab science.

***OR***

### **AP Physics C**

AP Physics C is a Calculus-based physics course. This is primarily a lecture/discussion course with an emphasis on laboratory experiments, data reporting and data interpretation. This course will concentrate on linear motion, projectile motion, forces, energy, momentum, rotational dynamics, harmonic motion and gravity. Students will develop algebra, calculus and problem-solving skills. This course utilizes a college level textbook and is classified as a lab science. Independent study and out of class work is expected.

### **Mentorship/Research Requirements**

Each student is required to conduct at least 100 - 150 hours of research through either an approved university or community-based program. This program is designed to give students first-hand experience in an industrial / work environment while under the guidance and mentorship of professionals. The research projects will be assigned at the start of the 2<sup>nd</sup> semester of their sophomore year and continue through the first semester of their senior year. Students will have the opportunity to experience research while under the guidance and mentorship of specialists in their area of interest, both in the community or at an approved university. Students will have the opportunity to choose from a wide range of career options in the areas of math, science, and technology and will then incorporate this experience into their Senior Research Project. Students will subsequently be required to prepare and present their research as part of their Senior Research Project during the 2<sup>nd</sup> semester of their senior year.

### **Senior Research Project**

Students will plan, organize, and present a Senior Research Project that describes the combined nature and application of their Research and Mentorship. Upon completion of a rigorous review process, each student will present their project to an audience, highlighting their experiences and knowledge gained over four years.

### **Additional Information**

Exemplar Scholars will be encouraged to submit science fair projects for state and national competition. Summer Learning Institutes will be encouraged and the Director of The Exemplar Scholars Program will help the student plan summer research around such opportunities.

Students will be placed together in the same Science, English and Social Studies courses for the first three years of the program. This will ensure continuity, competition, and collaboration with fellow Exemplar Scholars from year to year. This will also aid in administering the program requirements.

Exemplar Scholar students will participate in a group community service project each year in addition to the 60 hours required by Lexington Catholic for graduation.

## **Eligibility and Admission**

The Exemplar Scholars Program applicants will submit a portfolio to be reviewed by the Exemplar Scholars Program Director, Admissions Director, Assistant Principal, and Math and Science Department Chairs. The Exemplar Scholars application portfolio will include the following documentation:

- 1) Completion of Application for General Admission to LCHS.
- 2) Completion of Exemplar Scholars Application and Student Essay.
- 3) Applicants should score a 95<sup>th</sup> percentile or higher in one or more math subtests, the math composite and/or the, science or reading battery on the Terra Nova, CATS, Explore, or STS High School Placement Exam or ERB Assessment.
- 4) Applicants should have A's and B's in all core content classes.
- 5) Student Interest and Achievement Profile (completed by parent).
- 6) Teacher or Counselor Recommendation (2).
- 7) Other examples of student assessment such as ACT, SAT

## **Student Profile for Science**

The following is a typical student profile of an Exemplar Scholar at the conclusion of their science studies at LCHS.

Upon graduation, students will have fulfilled all requirements as stated in the KY Core Content of Studies with the addition of following: Comprehend the basic biological, chemical, and physical processes and principals that govern living organisms and the physical environment. Use the logic of the scientific method to answer questions and draw sound scientific conclusions. Apply science methodology and concepts to solve real world problems. Examine relations in diverse and complex environments and understand the position of humans in the hierarchy of life.

- I. Communicate Effectively
  1. Read scientific studies and listen to technical presentations with comprehension.
  2. Communicate the results of scientific investigations to their peers.
  3. Interact cooperatively with others during laboratory investigations.
  4. Demonstrate information processing and data manipulation through basic computer skills and generate clear and concise laboratory reports.
- II. Think Critically
  1. Make connections in learning across biology, chemistry, physics, and earth and space sciences and draw logical conclusions.
  2. Demonstrate problem solving through interpreting, analyzing, summarizing, and/or integrating a variety of materials.
  3. Use mathematics to organize, analyze, and synthesize data to solve problems.
- III. Learn Independently
  1. Use appropriate search strategies and resources to find, evaluate, and use information.
  2. Make choices based upon awareness of ethics and differing perspectives or ideas.
  3. Apply learning in academic, personal, and real-world situations.
  4. Think creatively to develop new ideas, processes, or products.

IV. Examine Relationships in Diverse and Complex Environments

1. Recognize the relationship of Catholic identity, reason, and faith to the science curriculum.
2. Demonstrate an awareness of the relationship of the individual to the biological and physical environment.
3. Develop an awareness of self as a member of the Lexington Catholic Faith Community within the global scientific community.

V. Advanced Science Application within the Exemplar Scholars Program

1. Develop appropriate and effective communication skills that enhance and contribute to university research projects or industrial application.
2. Effectively plan, organize, and present a Senior Research Project to the LCHS community.
3. Develop analytical and problem solving skills necessary for rigorous academic and industrial research.
4. Utilize independent learning skills that enhance exploration and practical application skills for research based projects.