



# Edward R. Murrow High School Science Department



The Science Department at Edward R. Murrow High School is fortunate to have a magnificent and unique physical plan which includes a Planetarium, a Greenhouse, a Marine Biology Laboratory, and a Student Research Laboratory, as well as Chemistry, Physics, Earth Science and Living Environment laboratories. We pride ourselves on the variety of Science classes, which are designed to meet the wide range of students' interests.

## Course Selection

1. Every student must successfully complete a minimum of three units of study for a high school diploma. One unit of study *must* include Living Environment. A second unit *must* consist of one of the Physical Setting courses - Chemistry, Earth Science or Physics.
2. Students interested in Murrow Med Certification should take a science class every semester of their stay at Murrow.

**Course Descriptions** -Except for selected students, all students entering Murrow follow the Regents sequence of Science courses. Although most entering students will take Regents Living Environment, alternatives include Regents Chemistry for strong math students or Regents Earth Science. Regents Physics is recommended as a culminating course.

## Regents Level Courses

### Living Environment      SLS21/2      2 SEMESTERS

A one year, standards based course where students study how organisms carry on basic life processes, evolve, reproduce and interact with one another and their environment. **Students complete a minimum of 1200 minutes of laboratory instruction**, as mandated by the New York State Education Department. This course culminates in a Regents exam. Students enrolled in this class will take the New York State Regents Examination upon completion of its sequence. This course is also offered in Chinese and Spanish. A Cooperative Team Teaching class is also offered.

### Physical Setting: Earth Science      SES21/2      2 SEMESTERS

A one year, standards based course where students study the history of the Earth and dynamic processes that formed and changed our planet, including plate tectonics, weather and astronomy. **Students complete a minimum of 1200 minutes of laboratory instruction**, as mandated by the New York State Education Department. Students enrolled in this class will take the New York State Regents Examination upon completion of its sequence this course is also offered in Chinese. A Cooperative Team Teaching class is also offered.

**Requirements:** Successful completion of Living Environment and Algebra

### Physical Setting: Chemistry      SCS21/2      2 SEMESTERS

**Prerequisites:** Living Environment and 2 semesters of Algebra or its equivalent.

A one year, standards based course where students study the structure of matter, physical and chemical changes, acid-base chemistry, oxidation and reduction, radioactivity and organic chemistry. **Students complete a minimum of 1200 minutes of laboratory instruction**, as mandated by the New York State Education Department. Students enrolled in this class will take the New York State Regents Examination upon completion of its sequence. A Cooperative Team Teaching class is also offered.

**Requirements:** Successful completion of Living Environment and/or Earth Science and Algebra, with a 75 + on Regents exams

### Physical Setting: Physics      SPS21/2      2 SEMESTERS

**Prerequisite:** Living Environment (Chemistry and/or Earth Science is recommended) and 4 semesters of Algebra & Geometry or its equivalent.

A one year, standards based course where students study motion, forces, energy, light and electricity. **Students complete a minimum of 1200 minutes of laboratory instruction**, as mandated by the New York State Education Department. Students enrolled in this class will take the New York State Regents Examination upon completion of its sequence.

**Requirements:** Successful completion of Earth Science and/or Chemistry and Geometry with a 75 + on Regents exams

## Third Year Non-Regents Courses

### Marine Science      SWS21/2 QB      2 SEMESTERS

Students will be study marine biology and oceanography, exploring how the physical and biological characteristics of the ocean interact to affect marine life.

**Requirements:** Successful completion of Living Environment.

**Astronomy**      **SRS21/2**      2 SEMESTERS  
Students will explore the cosmos in the Hubble Planetarium and in the classroom, discovering the worlds of the solar system, the stars of the Milky Way, and the origin and evolution of the universe. Students complete laboratory work once a week in the Planetarium.

**Requirements:** Successful completion of Earth Science and Algebra

**Environmental Science**      **SQS21/2 QE**      2 SEMESTERS  
Students will examine topics related to living ecology, energy and technology, environmental pollution and environmental analysis. **Extensive laboratory activities.**

**Requirements:** Successful completion of Living Environment, Earth Science and Algebra

**Forensic Science**      **SFS21/2**      2 SEMESTERS  
Students will investigate scientific methodologies used to solve crime, including DNA analysis, handwriting and fingerprinting analysis, blood splatter studies and crime scene recreation. **Extensive laboratory activities.** A Cooperative Team Teaching class is also offered.

**Requirements:** Successful completion of Living Environment and Algebra

**Intro to Computer Science (Amazon Future Engineer)**      **SKS21QP/2**      2 SEMESTERS  
A general elective offered to all grade levels. The course provides a solid foundation in object-oriented programming and prepares students for AP Computer Science Applications. Students will code in text-based Python. The course also provides career focus, where at the end of units, students meet (via videos) individuals from different industries who work in coding (medical, music, etc.) This course is part of the **Amazon's Future Engineer Program.**

**Requirements:** Algebra 1 prerequisite or concurrent enrollment.

**Non- Regents Physics (New)**      **SPS21QN/2**      2 SEMESTERS  
This course is a fully hands- on/inquiry based approach to learning physics. Students are provided with lab materials to conceptualize and formulate different strategies to apply physical concepts in investigating the answers to real world issues. Students will present and discuss their findings to their classmates. ***The responsibility of learning is placed on students;*** they must explain to their classmates what they have learned in such a way that ensures all classmates fully understand the material.

**Requirements:** Successful completion of Earth Science and/or Chemistry and Geometry with a 75 + on Regents exams. This is a lab-based approach to Physics. All labs are performed during class time.

**Pre-Engineering (Engineering the Future)**      **SKS41/2**      2 SEMESTERS  
Students explore cutting edge concepts of energy and matter, systems and systems models, structure and function. Students learn and practice like engineers. They will invent and improve products, processes and systems. They work to understand how technology affects society and the environment. They discover the complementary relationships among science, mathematics, technology and engineering.

**Requirements:** Successful completion of Living Environment and Algebra

## **Advanced Electives**

**Food Science**      **SQS21QF**      1 SEMESTER  
Students will discuss the processing, production, evaluation and use of food, covering the chemistry, biology and physics of nutrition.

**Requirements:** Successful completion of Living Environment and Algebra

**Genetics**      **SWS11QE**      1 SEMESTER  
Students will study genetics laws and principles as they relate to modern theories.

**Requirements:** Successful completion of Living Environment and Algebra

**Organic Chemistry**      **SDS11QC**      1 SEMESTER  
Students will analyze the science behind hydrocarbons, alcohols, aromatics, synthesis and mechanism.

**Requirements:** Successful completion of Chemistry and Geometry

**Anatomy & Physiology**      **SWS11QA**      1 SEMESTER  
Students will examine the essential principles of human anatomy and physiology, including basic chemistry, cell and tissue studies, and an overview of all the body systems.

**Requirements:** Successful completion of Living Environment and Algebra

**Space Science (Future)**      1 SEMESTER  
Students will uncover the latest astronomical discoveries, from the lives of the stars to planetary landscapes, and from the skies of the Hubble Planetarium to the beckoning universe outdoors.

**Requirements:** Successful completion of Earth Science and/or Astronomy and Geometry

**MURROW MED** - This is an **Honors Science Certificate** given to those students interested in careers related to medicine, pharmacy, dentistry, psychiatry, veterinary medicine or pure research who have excelled in science. Graduates must complete a minimum of six years of science study at Murrow. Within this six-year sequence, students must double –up on science by taking Living Environment, Chemistry & Physics, one year of Advanced Placement science, two semesters of Murrow Med electives, and one additional year that must be Earth Science, a second AP course or additional electives. Prior to graduation, students must file a Murrow Med certification form with the Science Department to verify completion of the above requirements. Students will be eligible for special awards at graduation.

## Special Programs

**M.S.T.A.R. PROGRAM** (*Mathematics Science Technology and Research*) - This program is designed for students who are interested in the Murrow Med program but would like to major in Science Research. Students who are part of the MSTAR program will complete the full Murrow Med program but take Science Research as their concentration of electives. Each student in the MSTAR program will be provided with the opportunity to do independent work at a research lab in the New York metropolitan area. Students will be expected to enter their projects in the school-wide science fair, as well as other competitions such as the Intel Science Talent Search, Otto Burgdorf Competition, ATC-SO and the New York City Science and Engineering Fair.

### Science Research Program (MSTAR)

Research Living Environment for 1<sup>st</sup> year research students: **SLS21QJ**

Research Chemistry for 1<sup>st</sup> year research students who have passed Living Environment: **SCS21QJF**

Research Chemistry for 2<sup>nd</sup> year research students: **SCS21QJ**

Research Physics for 2<sup>nd</sup> year research students who have passed Regents Chemistry: **SPS21QJF**

Research Physics for 3<sup>rd</sup> year research: **SPS21QJ**

**Prerequisite:** Approval of the Science Department A. P. & MSTAR Coordinator.

**Requirements:** Successful completion of Subject Area requirements with a G and 80+ on Regents exams. **Extensive lab activities, reading and writing involved.**

### INTEL SCIENCE SEMINAR

**SQS11**

1 or 2 SEMESTERS

Juniors and seniors who have already completed a science project will be provided with guidance and assistance in preparing the application and report for the Intel Science Talent Search. Students will be assisted with statistical analysis of their data. **Extensive lab activities, reading and writing involved.**

**Prerequisite:** Approval of the Science Department A. P. & MSTAR Coordinator.

**Requirements:** Successful completion of Subject Area requirements with a G and 80+ on Regents exams

### Sustainability Program (New) **SWS21Q/TM**

2 SEMESTERS

How can we live our lives to the fullest without using up all of earth's natural resources, so nothing is left for our children? This survey course will introduce students to the rapidly emerging field of environmental sustainability. Students will explore how human beings can continue to improve international standards of living without causing irreversible damage to the earth's limited natural resources. While this course is grounded in science and technology, it also will incorporate sociology, economics, politics, ethics, and philosophy.

- Students will analyze the environmental impact of the globalized American lifestyle.
- Students will critically examine the global use of fossil fuels and consumer-based economies
- Students will explore climate science trends with an emphasis on data analysis
- Students will contrast fossil fuel use with renewable energy sources
- Students will examine industrial agriculture and food production systems
- Students will learn about cutting edge waste management systems/recycling
- Students will focus on the economics and social equity of sustainable interventions

At the end of the semester students will design a sustainable project for their community. The project will include a description of the community issue based on the three pillars of sustainability (environment, equity, economics,) data analysis, current estimated ecological footprint, detailed description of the community/issues of equity, the sustainable technologies to be utilized, projected outcomes, projected new ecological footprint, estimated environmental/social/economic impacts.

### Robotics & Engineering Program (New) **SKS21QTM & SKS41/2** 2 SEMESTERS

The Robotics and Engineering Program at Edward R. Murrow High Schools seeks to provide all levels of students an introduction to engineering ideas, design innovations, and hands-on problem-solving. The program is intended to expose students to the framework within which engineers typically operate. Students will work in teams and design and built projects that are cost efficient. Students will be introduced to problems where multiple solutions are possible. Although the program is "field independent", it does introduce students to problems and ideas from specific engineering disciplines.

The goal of the program is to provide students with working knowledge of contemporary engineering practice, the problem solving process, and the tools and technologies engineers employ, as well as an understanding of the design process including competition, cost, quality, scheduling and manufacturability considerations and the opportunity to compete and practice in an actual design project - building a robot (NY FIRST Robotics and US NAVY Sea Perch competitions).

## Advanced Placement Courses

ADVANCED PLACEMENT **Biology**                      **SBS21/2X**                      2 SEMESTERS

**Requirements:** Successful completion of Living Environment, Chemistry and Geometry with a G and 85+ on Regents exams. **Extensive lab activities, reading and writing involved.**

ADVANCED PLACEMENT **Chemistry**                      **SCS21/2X**                      2 SEMESTERS

**Requirements:** Successful completion of Living Environment, Chemistry and Geometry with a G and 85+ on Regents exams. **Extensive lab activities, reading and writing involved.**

ADVANCED PLACEMENT **Physics**                      **SPS21/2X**                      2 SEMESTERS

**Requirements:** Successful completion of Living Environment, Regents Physics and Geometry with a G and 85+ on Regents exams. **Extensive lab activities, reading and writing involved.**

ADVANCED PLACEMENT **Environmental Science**                      **SQS21/2X**                      2 SEMESTERS

AP Environmental Science is an up-to-date introduction to the most important concepts in the environment. The approach is interdisciplinary in nature and integrates the natural sciences with environmental ethics, environmental economics, environmental law, environmental impact and environmental planning. **Extensive lab activities, reading and writing involved.**

**Requirements:** Successful completion of Living Environment, Earth Science and Geometry with a G and 85+ on Regents exams

ADVANCED PLACEMENT **Computer Applications**                      **TWS21/2X**                      2 SEMESTERS

This course is for anyone who wants to create (not just use) technology. We will learn the rules and instructions that are used to construct apps and computer programs. Why does pressing a "button" on a touch screen make something happen? We will then apply those instructions into creating our own apps with a partner. Along the way we will learn about how data is used, how the internet works, and how computers were first made. Extensive reading and writing involved.

**Requirements:** There are no specific pre-requisites (officially), but a student should have mastered basic algebraic concepts (as evidenced by a passing Algebra Regent score). **Juniors and Seniors only.**

The Advanced Placement courses in biology, chemistry, and physics are **rigorous, college-level, laboratory-based courses**. Students meet for a double band each week and cover a comprehensive curriculum. Students are required to attend an information session, make a full year commitment and successfully complete a summer assignment. All students who complete our AP courses are eligible to apply for and take an advanced placement examination which may earn them college credit.

### *For more information, please contact:*

#### **Mr. Carlos Reyes**

*A.P. Science Department*  
Edward R. Murrow H.S.  
718-258-9283 Ext. 3850  
[CReyes6@schools.nyc.gov](mailto:CReyes6@schools.nyc.gov)  
[www.ermurrowhs.org](http://www.ermurrowhs.org)

#### **Ms. Ray Chan**

*MSTAR Coordinator*  
718-258-9283 Ext. 4800  
[RSingh3@schools.nyc.gov](mailto:RSingh3@schools.nyc.gov)

#### **Ms. Virginia Gee-Sullivan**

*Greenhouse Coordinator*  
*(Aquaponics/Hydroponics)*  
718-258-9283 Ext. 3810  
[VGeeSullivan@schools.nyc.gov](mailto:VGeeSullivan@schools.nyc.gov)

#### **Mr. Marc Horowitz**

*Planetarium Coordinator*  
718-258-9283 Ext. 4920  
[MHorowitz@schools.nyc.gov](mailto:MHorowitz@schools.nyc.gov)

