

**ACADEMY FOR BUSINESS & TECHNOLOGY\***  
**\*A charter school of Eastern Michigan University, Ypsilanti, Michigan**  
**Melvindale, MI**

**Curriculum Guide—Department of Science**

**Teachers Credential Requirement:**

Course Number	Recommended Grade	Course Title	Recommended Prerequisite
	7 <sup>th</sup>	7 <sup>th</sup> Grade Science	
	8 <sup>th</sup>	Earth Science	
	9 <sup>th</sup> -10 <sup>th</sup>	Biology	
	9 <sup>th</sup> -10 <sup>th</sup>	Physical Science	
	11 <sup>th</sup> -12 <sup>th</sup>	Chemistry	Biology
	11 <sup>th</sup> -12 <sup>th</sup>	Environmental Science	Biology, Chemistry
	11 <sup>th</sup> -12 <sup>th</sup>	Forensics	Biology, Chemistry
	11 <sup>th</sup> 12 <sup>th</sup>	Anatomy & Physiology	Biology
	11 <sup>th</sup> -12 <sup>th</sup>	AP Biology	Biology, Chemistry
	8 <sup>th</sup>	STEM: Foundations of Science, Technology, Engineering, & Math	
	9 <sup>th</sup>	STEM: Introduction to Engineering Design	
	10 <sup>th</sup>	STEM: Principles of Engineering	

**Teachers Credential Requirement:**

	DX	General Science Science	<b>Biology</b> <b>Chemistry</b> <b>Physics</b> <b>Earth science</b> <b>Life Science</b> <b>Physical Science</b>
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**Course Descriptions--Science**

**7<sup>th</sup> GRADE SCIENCE**

**1 credit**

This course offers an opportunity to explore the world we live in while focusing on its three main branches: Physical, Life, and Earth Science. Topics of study include the Scientific Method, Waves and Energy, Chemistry, Climate and Weather, Water Cycle, and Organization of Living Things. Students will participate in hands-on lab activities, group and individual projects and technology applications. They will refine and further develop their science process skills.

**EARTH SCIENCE**

**1 credit**

The yearlong course of Earth Science focuses on the natural world around us. During the course of the year the students will discover the origins of the universe and our solar system, the content and features of our atmosphere, the causes of the weather the students' experience, climate in the United States, features of the ocean and finally the composition of the Earth and its structure. The students will encounter a variety of instructional strategies including lecture, projects, labs and group work. In addition to the course work the students will be expected to take notes and stay organized at all times to help them be successful in the class.

## **BIOLOGY**

**1 credit**

This yearlong study of biology allows high school students to develop increased science process skills, such as observing, making hypotheses and recording data. In the class, students will be provided the tools to construct new scientific knowledge while reflecting on scientific knowledge from previous science classes. In their efforts to practice the scientific method, students will be expected to demonstrate the process by participating in the annual science fair. Throughout the year, students will study and experiment with a variety of topics such as cells, organization of living things, heredity, evolution and ecosystems, and includes a dissection project.

## **PHYSICAL SCIENCE**

**1 credit**

This course will provide students the opportunity to learn about the properties of matter, chemical and physical changes, scientific classification, motion, force, simple machines, energy and sound. The hands on/minds on philosophy is integrated into the curriculum to provide students the opportunity to learn while doing.

## **CHEMISTRY**

**1 credit**

***Prerequisite: Biology***

This course will cover the fundamental laws and theories concerning the atom. Laboratory experiments are an integral part of this course. Students will take an in-depth look at atomic theory and structure, the elements, bonding, chemical reactions and stoichiometry. Students will learn about acids and bases, solutions, oxidation/reduction reactions, Organic Chemistry, electrochemistry and thermodynamics. Labs will be an integral part of this course. This course is a college preparatory class.

## **ANATOMY AND PHYSIOLOGY**

**1 credit**

***Prerequisite: Biology***

This course studies the structure and function of the human body and mechanisms for maintaining homeostasis within it. The course includes the study of cells, tissues, and the integumentary, skeletal, muscular and nervous systems. In addition, the endocrine, cardiovascular, lymphatic, respiratory, digestive, urinary and reproductive systems, as well as the concepts of development, metabolism, fluid and electrolyte balance, and acid-base balance are studied.

## **ENVIRONMENTAL SCIENCE**

**½ credit**

This course focuses on Ecosystems. Students learn common ecological relationships among species, how energy flows through familiar ecosystems and general factors regulating population size. Students use reading, writing and science process skills such as reading graphs and plotting data, observing, recording data and creating hypotheses. Students perform activities and labs as they work to become proficient in understanding and responding appropriately to a variety of scientific concepts while using the scientific method. Students create models demonstrating the energy cycles, the water cycle, the nitrogen cycle and the carbon cycle. This course also focuses on the effects of agriculture and other human activities on selected ecosystems. In their efforts to practice the scientific method, students will be expected to demonstrate the process by participating in the annual science fair.

## **FORENSICS**

**½ credit**

***Prerequisites: Biology, Chemistry***

This one semester course will analyze some to the basic techniques used in the study of forensics and criminology. Topics will include DNA, hair, blood, fingerprint, and glass analysis. As time permits additional topics may include study of tire tracks and splatter patterns. This class will have required laboratory work dealing with the various areas of forensic study.

## **AP BIOLOGY**

**1 credit**

***Prerequisites: Biology, Chemistry***

This is a course designed for students that have a strong interest in, or desire to pursue a career in, the sciences. The AP Biology course is designed to offer students topics that are covered in a freshman Biology course at the university level. Students accepting the challenge of an Advanced Placement course will be required to actively participate in all lectures and laboratory activities that are conducted during the year. Students will study eight major themes found in the official curricula requirements of AP Biology.

## **STEM CLASSES**

**1 credit each**

Students that attend any of the STEM courses can expect to embark upon engaging and stimulating subject matter. Coursework consists of a combination of STEM (Science, Technology, Engineering & Math) classes as well as courses that explore the broader impact of science and technology in society. Students also engage in classes aimed at improving their general and technical writing abilities.

### **1. Foundations in Science, Technology, Engineering, and Math**

The major focus of this course is to expose students to design process, research and analysis, teamwork, communication methods, global and human impacts, engineering standards, and technical documentation. Students will learn by doing project-, and problem-based assignments. Used in combination with a teaming approach, students will be challenged to continually hone their interpersonal skills, creative abilities and understanding of the design process.

This foundation course within the Project Lead the Way course sequence assumes no prior knowledge, but expects students to develop strategies to enable and direct their own learning, which is the ultimate goal of education. All of the topics learned in this course will be used in future courses.

### **2. Introduction to Engineering Design**

Students will employ engineering and scientific concepts in the solution of engineering design problems. In addition, students use a state of the 3D solid modeling design software package to help them design solutions to solve proposed problems. Students will develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges that increase in difficulty throughout the course. Students will also learn how to document their work, and communicate their solutions to their peers and members of the professional community.

### **3. Principles of Engineering**

Principles of Engineering (POE) is a high school-level survey course of engineering. The course exposes students to some of the major concepts that they will encounter in a postsecondary engineering course of study. Students have an opportunity to investigate engineering and high tech career POE gives students the opportunity to develop skills and understanding of course concepts through activity-, project-, and problem-based learning (APPB). Used in combination with a teaming approach, APPB learning challenges students to continually hone their interpersonal skills, creative abilities, and problem solving skills based upon engineering concepts. To be successful in POE, students need to be concurrently enrolled in college preparatory mathematics and science. Students will employ engineering and scientific concepts in the solution of engineering design problems. Students will develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges. Students will also learn how to document their work and communicate their solutions to their peers and members of the professional community.