

# Dayton Regional STEM School

## Grades 6-8

### Course Descriptions





### **Our Mission**

The Mission of the Dayton Regional STEM School is to prepare students with the skills necessary to compete in the global economy while nurturing in our young people the same enthusiasm for discovery, invention, and application that launched the vision for powered flight.

This Mission is inspired by the Dayton region's history, and is aimed at ensuring our community's future success.

### **Project Based Learning**

At DRSS, we focus on using Project Based Learning in our curriculum. This teaching practice involves students learning through projects that address real-world problems and challenges. Throughout their education at DRSS, students will routinely learn the content through the process of completing projects. We rely on our large group of local partners to assist in providing authentic problems to allow our students the opportunity to give back to the community.

### **Five Qualities**

In addition to our regular instruction, we teach, practice, model and assess the following “five important qualities” at the Dayton Regional STEM School:

**PERSISTENCE – INQUIRY – COMMUNICATION – CREATIVITY – COLLABORATION**

## **Table of Contents**

<b>5</b>	<b>6<sup>th</sup> Grade Courses</b>
<b>9</b>	<b>7<sup>th</sup> Grade Courses</b>
<b>12</b>	<b>8<sup>th</sup> Grade Courses</b>

## 6<sup>th</sup> Grade Courses – Year Long

### Language Arts 6

Language Arts 6 is an integrated course that incorporates all of the following standards: language development, reading informational texts, reading literature, speaking and listening, and writing. These components are practiced through a series of thematic units centered on realistic fiction/personal narrative, science-fiction, historical fiction, and fantasy novels. While exploring these different genres, students will be exposed to a variety of writing styles. Students will explore the writing process by creating meaningful writing pieces such as a personal narrative, an argumentative essay, an informational piece, and a fictional essay. Speaking and listening skills will be developed throughout each unit by practicing open class discussions, small group collaboration, and class presentations.

### Math 6

Connected Mathematics is the curriculum used for students in grade 6. This middle school mathematics curriculum is rich in connections among core ideas of mathematics, between subjects, among activities and interests of students, and between mathematics and its connections outside of the classroom. The units for 6<sup>th</sup> grade include Factors and Multiples; Understanding and Computing with Fractions, Decimals, and Percentages; Two-Dimensional Measurement and Geometry; Understanding Probability; and Statistics.

### Math 7A

Connected Mathematics is the curriculum used for students in grade 7. This middle school mathematics curriculum is rich in connections among core ideas of mathematics, between subjects, among activities and interests of students, and between mathematics and its connections outside of the classroom. The units for 7<sup>th</sup> grade include mathematical concepts of algebraic variables, expressions, patterns, scale factor, scale models, ratios, proportions, rational numbers, linear relationships, volume, surface area, probability and measures of data distributions.

### Science 6

The middle school science curriculum at DRSS is called IQWST (Investigating and Questioning our World through Science and Technology--pronounced I-quest). In 6<sup>th</sup> grade science, the sequence of physics, earth science, biology and chemistry instruction builds upon students' prior knowledge and experiences in the real world, and builds

understanding from unit to unit both within and across the middle school years. Students learn complex scientific ideas by engaging in practices that include working with models, constructing scientific explanations, engaging in argumentation and debate, analyzing data gathered either from students' own investigations or captured within complex datasets, and presenting ideas to peers. Science content learned through this course will include the interaction of light and matter, the particle nature of matter, organisms and ecosystems, and the water and rock cycles.

### **Social Studies 6**

In sixth grade social studies, students will learn about the ancient river valley civilizations of Ancient Egypt, Ancient China, Mesopotamia, and the Indus Valley. Thematic units about different types of governments, economies, and religions are a few of the major topics discussed. Students will work collaboratively to discover what lessons these ancient civilizations have taught our modern societies, and how ancient civilizations still impact our world today. In social studies 6, students will research new information and help share that information with their peers. Units on mapmaking, timelines, and other basic geographical and historical skills will be learned throughout the year.

### **STEM Explorations 6**

STEM Explorations 6 will provide middle school students with problem solving skills using the design process. As part of an introduction to the IT pathway, students will gain foundational knowledge of current HTML5 web design standards. They will apply this knowledge to plan, design and develop their Dayton Regional STEM School portfolio using valid, well-formed, scalable and semantically correct HTML5. During the creation process, students will identify and apply the elements of design: balance, rule of thirds, emphasis, padding, color, and line. As part of an introduction to the Engineering Pathway we will utilize the Engineering Design Process through various projects (i.e. instrument creation and 3D design.). Through the above pathways, students will also learn and implement 21st Century Skills (ISTE Standards), such as effective communication, collaboration, Growth Mindset, project management, time management and so forth.

### **Middle School Wellness and Fitness**

Middle School Wellness & Fitness is designed to motivate students to build healthy lifestyles for today and the future in all aspects of health-physical, mental/emotional, and social. The curriculum is designed to increase student knowledge & skills in a variety of adolescent health topics in order to achieve and maintain wellness. Topics to be addressed include healthy behaviors, goal setting, decision-making, nutrition, safe and proper use of medicines, substance abuse, and puberty/reproductive health & disease prevention. In addition, students will regularly participate in physical activity to enhance their individual fitness levels. During this course, students will demonstrate an improvement in their cardiovascular endurance and muscular endurance.

## 7<sup>th</sup> Grade Courses – Year Long

### Language Arts 7

In this course, students will explore reading and writing through a workshop style classroom. Students will be exposed to various styles and genres of writing, and will take individual and group writing pieces through the complete writing process. Theme based novels and informational texts will be used in small group settings for students to learn and practice communication, cooperation, and collaboration. Literature circles will be used to study the genres of fantasy/dystopian and survival fiction. Reading and writing assignments will be supported by mini-lessons and class discussion to enhance student learning and comprehension. Projects and activities in the class are designed to push students to be stronger and more confident advocates, collaborators and communicators in preparation for their future endeavors.

### Math 7

Connected Mathematics is the curriculum used for students in grade 7. This middle school mathematics curriculum is rich in connections among core ideas of mathematics, between subjects, among activities and interests of students, and between mathematics and its connections outside of the classroom. The units for 7<sup>th</sup> grade include mathematical concepts of algebraic variables, expressions, patterns, scale factor, scale models, ratios, proportions, rational numbers, linear relationships, volume, surface area, probability and measures of data distributions.

### Pre-Algebra

This course focuses on higher mathematical thinking and problem solving, with an emphasis on algebra. The units include concepts of algebraic variables, expressions, patterns, scale factor, scale models, ratios, proportions, rational numbers, linear relationships, and geometry. Students are expected to be proficient in basic arithmetic skills, to work at an accelerated pace and open to work on self-guided independent projects.

### Science 7

The middle school science curriculum at DRSS is called IQWST (Investigating and Questioning our World through Science and Technology--pronounced I-quest). In 7th grade science, the sequence of chemistry, physics, and earth science instruction builds upon students' prior knowledge and experiences in the real world, and builds understanding from unit to unit both within and across the middle school

years. Students learn complex scientific ideas by engaging in practices that include working with models, constructing scientific explanations, engaging in argumentation and debate, analyzing data gathered either from students' own investigations or captured within complex datasets, and presenting ideas to peers. Science content learned through this course includes chemical reactions, energy transformations, and weather and seasons.

### **Digital Explorations 7**

Digital Explorations 7 will expand upon STEM Explorations 6. Students will delve deeper into the IT pathway by honing their HTML5 web design skills and incorporating current CSS best practices in order to practice planning, designing, and developing their Dayton Regional STEM School portfolio. Students will also continue to use valid, well-formed, scalable and semantically correct HTML5/CSS. During the creation process, students will identify and apply the elements of design: balance, rule of thirds, emphasis, padding, color, and line. Through the IT pathway students will continue to build upon 21st Century Skills (ISTE Standards), such as effective communication, collaboration, Growth Mindset, project management, time management and so forth.

### **World History 7**

This course will look at world history from the period of the Ancient Greek and Roman Empires to the time period of trade and exploration in the 1500's. The course will be broken into thematic units: Ancient Greece/Rome, Middle Ages, Renaissance, Reformation of the church, and Trade and Exploration. In these units we will look at the impacts of the Greeks, Romans, and Renaissance achievements by making connections to our lives today. Through these units, we will analyze how impacts of Greek, Roman, and Renaissance achievements have affected the rest of the world. Students will make class connections to understand how these achievements later get shared through the European trade and exploration time period to the western world. Students will engage in learning through research driven projects, discussions, primary and secondary source analysis, and hands on activities.

### **Middle School Wellness and Fitness**

#### *Semester Course*

Middle School Wellness & Fitness is designed to motivate students to build healthy lifestyles for today and the future in all aspects of health-physical, mental/emotional, and social. The curriculum is designed to

increase student knowledge & skills in a variety of adolescent health topics in order to achieve and maintain wellness. Topics to be addressed include healthy behaviors, goal setting, decision-making, nutrition, safe and proper use of medicines, substance abuse, and puberty/reproductive health & disease prevention. In addition, students will regularly participate in physical activity to enhance their individual fitness levels. During this course, students will demonstrate an improvement in their cardiovascular endurance and muscular endurance.

### **Engineering Design**

#### ***Semester course***

Throughout the semester, students will plan and implement engineering solutions through the process of: design and build a solution, evaluate and determine effective design features within a design, redesign a solution, and explain reasons for design decisions. Students will acquire knowledge and skills in problem solving, teamwork, and innovation as they explore engineering fields. These skills will be introduced and practiced throughout the course.

*The following courses have their content split and integrated into the classes listed above, and are not taught as their own individual course.*

### **Web Design**

*In this course students will create a website with tag text elements, special characters, lines, graphics, hypertext links, and graphical tables.*

### **Pre-Engineering**

*Students in this pre-engineering course will acquire the knowledge and skills in problem solving, teamwork and innovation. Students explore STEM careers as they participate in a project-based learning process, designed to challenge and engage the natural curiosity and imagination of middle school students. Teams may design and test their ideas using modeling, automation, robotics, mechanical and computer control systems.*

## **8<sup>th</sup> Grade Courses – Year Long**

### **Honors Algebra 1** - (high school credit – 1 credit)

Students closely examine a variety of functions in this course, and study methods for solving problems involving those functions. These functions include linear, quadratic, and exponential. Students study connections between the graphical, numerical (table), and symbolic (equation) representations of each of these functions. Students apply representations to real life situations to solve problems about the situations. They use data to create models to solve problems and predict outcomes. Students often work in cooperative groups to participate in inquiry learning.

### **Math 8**

This course uses the Connected Math series as the primary curriculum. Connected Math provides a wonderful opportunity for teachers, students, and parents to challenge their previous knowledge of math and to make new, rich connections between different strands of math, different content areas, and the real world. Students are expected to work in cooperative groups, in which discussion and discovery are encouraged and celebrated! Major mathematical concepts in the 8th grade curriculum include mathematical modeling, linear relationships, exponents, coordinate geometry, and basic algebraic manipulation.

### **Language Arts 8**

This course will have students exploring different genres of literature such as nonfiction memoirs, graphic novels, plays, and poetry. Authors we will be looking at include Shakespeare, Hughes, Dickinson, and Sharon Draper. An emphasis on integration with other courses will be made by writing a formal scientific explanation, writing a poem or dramatic piece with a focus on wellness, creating an infographic that looks at various demographics throughout history, and reviewing and working with academic vocabulary from all content areas. Students will also spend time working on speaking and presentation skills through informal book talks, large and small-group discussions, and a formal presentation late in the year.

## **Science 8**

The middle school science curriculum at DRSS is called IQWST (Investigating and Questioning our World through Science and Technology--pronounced I-quest). In 8th grade science, the sequence of physics, earth science, biology and chemistry instruction builds upon students' prior knowledge and experiences in the real world, and builds understanding from unit to unit both within and across the middle school years. Students learn complex scientific ideas by engaging in practices that include working with models, constructing scientific explanations, engaging in argumentation and debate, analyzing data gathered either from students' own investigations or captured within complex datasets, and presenting ideas to peers. Science content learned through this course will include genetics and heredity, plate tectonics, and forces and motion.

## **Digital Design 8**

Digital Design 8 will empower students to become collaborators, innovators, inventors, and explorers of coding as the language of tomorrow. Instruction topics include the fundamentals of computer systems and networks, engineering design, 3D printing, digital media, system development life cycle, HTML, and CSS taught through exciting hands-on projects including integration in cross-content projects, production of video reflections, creation of websites for a client, and enhancement of digital portfolios. In addition to technical skill development, a concentration on 21st century skills including problem solving, time management, work ethic, accountability, critical thinking, self-reflection, and effective communication will be woven into this course. In the final stages of this course, students will formally present their portfolio to peers, faculty, and family.

## **US History 8**

Students will investigate the history of the United States from European exploration until the Reconstruction Era. This course will feature the people, events, and ideas that shaped the United States as we know it today. Students will be engaged in the history of our country and encouraged to examine multiple perspectives through PBL, simulations, research, primary sources, debate, and much more. From taking on the role of a fur trader prior to the American Revolution to synthesizing the experiences of different groups of people during the Civil War, students will be immersed into the history of a young United States.

## **Middle School Wellness and Fitness**

### *Semester Course*

Middle School Wellness & Fitness is designed to motivate students to build healthy lifestyles for today and the future in all aspects of health-physical, mental/emotional, and social. The curriculum is designed to increase student knowledge & skills in a variety of adolescent health topics in order to achieve and maintain wellness. Topics to be addressed include healthy behaviors, goal setting, decision-making, nutrition, safe and proper use of medicines, substance abuse, and puberty/reproductive health & disease prevention. In addition, students will regularly participate in physical activity to enhance their individual fitness levels. During this course, students will demonstrate an improvement in their cardiovascular endurance and muscular endurance.

## **Engineering Design**

### *Semester course*

Throughout the semester, students will plan and implement engineering solutions through the process of: design and build a solution, evaluate and determine effective design features within a design, redesign a solution, and explain reasons for design decisions. Students will acquire knowledge and skills in problem solving, teamwork, and innovation as they explore engineering fields. These skills will be introduced and practiced throughout the course.

*The following courses have their content split and integrated into the classes listed above, and are not taught as their own individual course.*

## **Web Design**

*In this course students will create a website with tag text elements, special characters, lines, graphics, hypertext links, and graphical tables.*

## **Pre-Engineering**

*Students in this pre-engineering course will acquire the knowledge and skills in problem solving, teamwork and innovation. Students explore STEM careers as they participate in a project-based learning process, designed to challenge and engage the natural curiosity and imagination of middle school students. Teams may design and test their ideas using modeling, automation, robotics, mechanical and computer control systems.*





The Dayton Regional

**S** **T** **E** **M**

S c h o o l

[daytonstemschool.org](http://daytonstemschool.org)