

# Pequannock Township School District

## Curriculum Syllabus

### Robotics

## Course Description:

The goal of this course is to increase the proficiency of each student in the skills they need to succeed in the STEM fields. These skills include, but are not limited to: structural design, problem solving, programming, critical thinking, long-term planning, and electrical engineering.

Most class periods will be spent in group work on projects, involving each step of the VEX robotics system. Students will follow a course format including online resources and hands-on projects. This class will allow students to experience school and the classroom in ways which reflect industry practices and models. Students will then solve a real world problem, created and evaluated by their peers, by applying their skills to develop a proposed solution, prototype, and see the project to completion.

## Course Standards:

### Practice 2. Collaborating Around Computing

- 2 1. Cultivate working relationships with individuals possessing diverse perspectives, skills, and personalities.
- 2 2. Create team norms, expectations, and equitable workloads to increase efficiency and effectiveness.
- 2 3. Solicit and incorporate feedback from, and provide constructive feedback to, team members and other stakeholders.

### Practice 6. Testing and Refining Computational Artifacts

- 6 1. Systematically test computational artifacts by considering all scenarios and using test cases.
- 6 2. Identify and fix errors using a systematic process.
- 6 3. Evaluate and refine a computational artifact multiple times to enhance its performance, reliability, usability, and accessibility.

### 9.2 Career Awareness, Exploration, and Preparation

This standard outlines the importance of being knowledgeable about one's interests and

talents, and being well informed about postsecondary and career options, career planning, and career requirements.

## Scope and Sequence

<b>Unit 1 – Fundamentals of Robotics</b>	8.1.12.A 8.1.12.B 8.1.12.C 8.1.12.C.5 8.2.12.D.3 8.2.12.E.3 8.1.12.E 8.1.12.F 9.3.ST.1 9.3.ST.6 9.3.ST-ET.1 9.3.ST-ET.3 9.3.ST-SM.2 CRP4 CRP6 CRP8 CRP12
<b>Unit 2 – Movements</b>	9.3.ST-ET.1 9.3.ST-ET.2 9.3.ST-ET.4 9.3.ST- SM.2 9.3.ST-SM.4 8.1.12.A.1 8.1.12.C.5
<b>Unit 3 – Remote Control Systems</b>	9.3.ST-ET.1 9.3.ST-ET.2

9.3.ST-ET.4  
9.3.ST- SM.2  
9.3.ST-SM.4  
8.1.12.A.1  
8.1.12.C.5  
8.2.12.D.1  
8.2.12.E.3

**Unit 4– Programming & Sensors**

8.2.12.A.1  
8.2.12.B.1  
8.1.12.A  
8.1.12.B  
8.2.12.C.3  
8.1.12.C.5  
8.2.12.D.1  
8.2.12.E.3  
9.3.ST.1  
9.3.ST.6  
9.3.ST-ET.1  
9.3.ST-ET.2  
9.3.ST-ET.4  
9.3.ST-ET.5  
9.3.ST-ET.6  
9.3.ST-SM.1  
9.3.ST-SM.2  
ETS1.B  
ETS1.C  
CRP2  
CRP4  
CRP6  
CRP8  
CRP11

**Unit 5 – Sound & Lights Sensors**

8.1.12.A.1  
8.1.12.B  
8.2.12.A.1  
8.2.12.B.1  
8.2.12.C.3  
8.1.12.C.5  
8.2.12.D.1  
8.2.12.E.3

## Assessments

CCSS/NJCCCS/NGSS	Common Core State Standards/NJCCCS/NGSS
9.3.ST-ET.1	Use STEM concepts and processes to solve problems involving design and/or production.
9.3.ST-ET.2	Display and communicate STEM information.
9.3.ST-ET.4	Apply the elements of the design process.
9.3.ST-SM.2	Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.
9.3.ST-SM.4	Apply critical thinking skills to review information, explain statistical analysis, and to translate, interpret and summarize research and statistical data.
8.1.12.A.1	Create a personal digital portfolio.
8.2.12.C.5	Create scaled engineering drawings of products both manually and digitally with materials and measurements labeled.
8.2.12.D.1	Design and create a prototype to solve a real world problem using a design process, identify constraints addressed during the creation of the prototype, identify trade-offs made, and present the solution for peer review.
8.2.12.E.3	Use a programming language to solve problems or accomplish a task.
ETS1.B	When evaluating solutions it is important to take into account a range of constraints including cost, safety, reliability, and aesthetics and to consider social, cultural and environmental impacts.
ETS1.C	Criteria may need to be broken down into simpler ones that can be approached systemically, and decisions about the priority of certain criteria over others (tradeoffs) may be needed.
CRP4	Communicate clearly and effectively and with reason.
CRP6	Demonstrate creativity and innovation.
CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP12	Work productively in teams while using cultural global competence.

## Curriculum Resources

**This course was written to meet the requirements of the STEM – VEX Robotics grade 9-12 course. This course will follow a full year A/B schedule averaging 90 days.**

### Instructional Resources:

<http://www.state.nj.us/education/cccs/standards/9/>

**Technology Resources:**

[http://www.education.rec.ri.cmu.edu/products/teaching\\_robotc\\_cortex/index.html](http://www.education.rec.ri.cmu.edu/products/teaching_robotc_cortex/index.html)

## **Home and School Connection**

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