

Wilson Area School District Planned Course Guide

Title of planned course: 6th Grade Tech Ed.

Subject Area: Technology Education

Grade Level: 6

Course Description: This curriculum introduces 6th-grade students to the fundamentals of robotics using VEX Robotics kits, VEX coding, Code.org, and RoboArm programs. Students will engage in hands-on activities that promote critical thinking, problem-solving, and collaboration.

- Understand basic robotics concepts and components.
- Learn to construct and program robots using VEX kits.
- Develop coding skills through VEX coding and Code.org.
- Explore robotic applications through the RoboArm program.

Time/Credit for this Course: 35 Days

Curriculum Writing Committee: Brian Meckley

Curriculum Map

Week 1: Introduction to Robotics

- **Lesson 1:** What is Robotics?
 - Discuss definitions and applications of robotics in daily life.
 - Introduction to various types of robots.
- **Lesson 2:** Components of a Robot
 - Identify parts of the VEX Robotics kit (motors, sensors, controllers).
 - Hands-on exploration of the kit components.

Week 2: Building with VEX Robotics

- **Lesson 3:** Constructing a Simple Robot
 - Guided instruction on building a basic robot using VEX kits.
 - Emphasize teamwork and collaboration during the building process.
- **Lesson 4:** Testing and Troubleshooting
 - Test the functionality of the constructed robot.
 - Discuss common issues and troubleshooting techniques.

Week 3: Introduction to Coding

- **Lesson 5:** Basics of Coding
 - Introduce coding concepts and their importance in robotics.
 - Overview of VEX coding interface.
- **Lesson 6:** VEX Coding Challenge
 - Create simple programs to control robot movements.
 - Use loops and conditionals to enhance programming skills.

Week 4: Advanced VEX Coding

- **Lesson 7:** Sensors and Feedback
 - Explore the use of sensors in robotics (e.g., touch, distance).
 - Learn how to integrate sensor data into coding.
- **Lesson 8:** Coding with VEX and Sensors
 - Program the robot to respond to sensor inputs.
 - Conduct challenges using sensory feedback.

Week 5: Introduction to Code.org

- **Lesson 9:** Online Coding with Code.org
 - Overview of Code.org and its educational resources.
 - Complete introductory coding exercises.
- **Lesson 10:** Project-Based Coding
 - Work on a project that integrates concepts learned on Code.org.
 - Encourage creativity and application of coding skills.

Week 6: Exploring the RoboArm

- **Lesson 11:** Introduction to the RoboArm Program
 - Discuss the purpose and functionality of the RoboArm.
 - Explore how robotic arms are used in industries.
- **Lesson 12:** Programming the RoboArm
 - Hands-on experience programming the RoboArm for specific tasks.
 - Collaborate in small groups to complete challenges.

Week 7: Final Projects and Presentations

- **Lesson 13:** Final Project Preparation
 - Students work on a final project that combines their robotics and coding knowledge.
 - Encourage creativity in designing their own robot or coding challenge.
- **Lesson 14:** Project Presentation Day
 - Students present their final projects to the class.
 - Reflect on what they learned throughout the unit and the challenges they faced.

Curriculum Scope & Sequence

Planned Course: 6th Grade Tech Ed

Unit: Measurement by 16ths of an inch

Time frame: 1 week

State Standards 3.5.6-8.a, 3.5.6-8.j, 3.5.6-8.o, 3.5.6-8.q, 3.5.6-8.v, 3.5.6-8.cc

Essential content/objectives: At the end of the unit, students will be able to select and use appropriate instruments to measure objects using standard measurement, to the nearest 1/16th of an inch.

Core Activities: Students will complete/participate in the following:

- Lecture
- Demonstration
- Application
- Practice measuring with rulers
- Create and engrave a design onto a folder using the laser engraver

Extensions: “ Human Ruler” activity

Remediation:

- Teacher assistance
- Extra worksheets

Instructional Methods:

- Lecture
- Demonstration
- Guided practice
- Independent practice.

Materials & Resources:

- Rulers
- Worksheets
- Quizzes
- Posters.

Assessments:

- Quiz
- Observation of application
- Project work

Curriculum Scope & Sequence

Planned Course: 6th Grade Tech Ed

Unit: Vex Robotics

Time frame: 4 weeks

State Standards: 3.5.6-8.a, 3.5.6-8.c, 3.5.6-8.f, 3.5.6-8.g, 3.5.6-8.k, 3.5.6-8.n 3.5.6-8.o, 3.5.6-8.p, 3.5.6-8.q, 3.5.6-8.r, 3.5.6-8.u, 3.5.6-8.v, 3.5.6-8.x, 3.5.6-8.y, 3.5.6-8.z, 3.5.6-8.bb, 3.5.6-8.hh, 3.5.6-8.kk, 3.5.6-8.ll

Essential content/objectives: At the end of the unit, students will be able to:

- Examine the relationship between math, science, technology, and engineering
- Illustrate examples of technological systems in the areas of technology
- Explain how technology is assessed
- Examine the basics of design elements
- Demonstrate optimization in engineering design
- Demonstrate technological problem solving
- Demonstrate research and design principles
- Use and maintain technological products, and systems
- Assess the impact of technological systems
- Analyze communication technologies
- Integrate activities through math, science, and communication topics to enhance technology content areas
- Demonstrate effective teamwork, and organization
- Demonstrate the integration of academic and technical skills through competitive events.
- Find relevant information from within word problems
- Read a blueprint

Core Activities: Students will complete/participate in the following:

- Lecture, Demonstration, Application
- Define and explain applications of robots in daily life
- Identify the parts of the Vex Robotics kit: motors, sensors, and controllers
- Build a basic robot using the Vex kit
- Test the functionality of the robot created
- Troubleshoot and problem solve common issues related to the building of the Vex robot
- Explore the Vex coding interface
- Create simple programs using Vex coding to control robot movements
- Use loops and conditional to enhance programming skills
- Use the sensors to explore the use of touch, distance, etc. in robotics
- Integrate sensor data into coding
- Program the robot to respond to sensor inputs

Extensions: Students will assemble progressively more difficult projects.

Remediation:

- Teacher assistance
- Peer tutoring
- Trial and error

Instructional Methods:

- Lecture
- Demonstration
- Guided practice
- Independent practice

Materials & Resources:

- Vex robotics kits
- Vex block coding software
- ebook
- Paper book instruction manuals

Assessments:

- Participation in class activities and discussions
- Completion of coding exercises on Code.org
- Functionality and creativity of the constructed robots
- Quality and clarity of final project presentations

Curriculum Scope & Sequence

Planned Course: 6th Grade Tech Ed

Unit: Vex Coding, Python, and Basic coding

Time frame: 1-2 weeks

State Standards: 3.5.6-8.a, 3.5.6-8.c, 3.5.6-8.f, 3.5.6-8.g, 3.5.6-8.k, 3.5.6-8.n 3.5.6-8.o, 3.5.6-8.p, 3.5.6-8.q, 3.5.6-8.r, 3.5.6-8.u, 3.5.6-8.v, 3.5.6-8.x, 3.5.6-8.y, 3.5.6-8.z, 3.5.6-8.bb, 3.5.6-8.hh, 3.5.6-8.kk, 3.5.6-8.ll

Essential content/objectives: At the end of the unit, students will be able to:

- Examine the relationship between math, science, technology, and engineering.
- Illustrate examples of technological systems in the areas of technology
- Explain how technology is assessed
- Examine the basics of design elements
- Demonstrate optimization in engineering design
- Demonstrate technological problem solving
- Demonstrate research and design principles
- Analyze communication technologies
- Integrate activities through math, science, and communication topics to enhance technology content areas
- Demonstrate effective teamwork, and organization
- Demonstrate the integration of academic and technical skills through competitive events.
- Find relevant information from within word problems
- Write simple program code using Python, and Basic Languages

Core Activities: Students will complete/participate in the following:

- Lecture, Demonstration, Application.
- Explore code.org and complete introductory coding exercises
- Explore the purpose and functionality of the RoboArm and how robotic arms are used in industries
- Program the RoboArm to complete specific tasks in small groups to complete challenges

Extensions: Students will code progressively more difficult projects

Remediation:

- Teacher assistance
- Peer tutoring
- Trial and error

Instructional Methods:

- Lecture
- Demonstration
- Guided practice
- Independent practice

Materials & Resources:

- Vex robotics kits
- Robo Arm Robot arms
- Vex block coding software
- ebook
- Paper book instruction manuals
- RoboArm materials and robots
- Code.org website

Assessments:

- Participation in class activities and discussions
- Completion of coding exercises on Code.org
- Functionality and creativity of the constructed robots
- Final function of Robo Arm programs
- Quality and clarity of final project presentations