

## Wilson Area School District Planned Course Guide

**Title of planned course:** 8<sup>th</sup> Grade Tech Ed.

**Subject Area:** Tech Ed.

**Grade Level:** 8

**Course Description:** This course is designed for 8th-grade students to explore the fascinating world of aerodynamics and develop practical woodworking skills. Through a combination of theoretical concepts and hands-on projects, students will gain a comprehensive understanding of the principles that govern flight and the techniques required to work with various woodworking tools.

**Time/Credit for this Course:** 35 Days

**Curriculum Writing Committee:** Brian Meckley

# Curriculum Map

## **Week 1: CNC Router and Laser Engraver**

- **Topics Covered:**
  - Introduction to CNC technology and laser engraving
- **Activities:**
  - Hands-on activities: Design a simple project using CNC software and engrave a design on wood
  - Discussion on the applications of CNC and laser technology in woodworking

## **Week 2: Basics of Aerodynamics**

- **Topics Covered:**
  - Introduction to forces acting on an aircraft: Lift, Weight, Thrust, Drag
  - Understanding Bernoulli's principle and its application in flight
- **Activities:**
  - Simple experiments with paper airplanes to demonstrate lift and drag
  - Group discussion on how different designs affect flight performance

## **Week 3: Flight Principles and Aircraft Types**

- **Topics Covered:**
  - Overview of different types of aircraft (fixed-wing, rotorcraft, etc.)
  - Exploring Newton's laws of motion and their relation to flight
- **Activities:**
  - Hands-on project: Build and test different wing designs using foam or cardboard
  - Research project on a specific aircraft and its aerodynamic features

## **Week 4: Safety and Basic Tools**

- **Topics Covered:**
  - Overview of safety procedures in the woodworking shop
  - Introduction to basic tools: Miter saw, band saw, jigsaw, planer, and jointer
- **Activities:**
  - Safety quiz and tool identification exercise
  - Practice measuring and marking wood

## **Week 5: Basic Woodworking Technique**

- **Topics Covered:**
  - Learning to measure, cut, and assemble wood pieces
- **Activities:**
  - Hands-on project: Create a simple wooden project (e.g., a small shelf or birdhouse)
  - Measure, cut, and assemble using wood glue and fasteners

## **Week 6: Advanced Tools and Techniques**

- **Topics Covered:**
  - Introduction to drill press, belt sander, oscillating spindle sander, and disc sander
- **Activities:**
  - Demonstration of each tool's operation and maintenance
  - Practice using each tool on scrap wood in preparation for the final project

## **Week 7: Final Project and Presentation**

- **Topics Covered:**
  - Students will select a project that incorporates both aerodynamics and woodworking skills
- **Activities:**
  - Planning phase: Sketch designs, create materials list, and outline steps
  - Execution phase: Build the project using learned techniques and tools
  - Presentation: Students will present their final projects to the class, explaining their design choices and the aerodynamics involved

## Curriculum Scope & Sequence

**Planned Course:** 8<sup>th</sup> Grade Tech Ed.

**State Standards** 3.5.6-8.a, 3.5.6-8.b, 3.5.6-8.g, 3.5.6-8.i, 3.5.6-8.j, 3.5.6-8.k, 3.5.6-8.l, 3.5.6-8.m, 3.5.6-8.n, 3.5.6-8.o, 3.5.6-8.p, 3.5.6-8.q, 3.5.6-8.s, 3.5.6-8.t, 3.5.6-8.u, 3.5.6-8.v, 3.5.6-8.w, 3.5.6-8.x, 3.5.6-8.bb, 3.5.6-8.dd, 3.5.6-8.ii, 3.5.6-8.kk

**Essential content/objectives:** By the end of this course, students will have a solid foundation in both aerodynamics and woodworking techniques, fostering a passion for technology and engineering while encouraging teamwork, creativity, and problem-solving skills.

- **Aerodynamics:** Students will learn about the forces acting on objects, such as lift, weight, thrust, and drag. They will investigate how these forces interact through hands-on activities and experiments, including building and testing model cars and wing designs.
- **Woodworking Skills:** Students will develop essential woodworking skills, including safe tool usage, measuring and cutting techniques, and the assembly of wooden projects. They will gain experience with a variety of tools, such as the miter saw, band saw, jigsaw, drill press, and advanced equipment like CNC routers and laser engravers.
- **Final Projects:** The course culminates in a final project where students will apply their knowledge of aerodynamics and woodworking skills to create a unique project. These projects will be presented to the class, allowing students to showcase their creativity and understanding of the material.

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

- Design a simple project using CNC software and engrave a design on wood
- Discussion on the applications of CNC and laser technology in woodworking
- Simple experiments with paper airplanes to demonstrate lift and drag
- Group discussion on how different designs affect flight performance
- Hands-on project: Build and test different wing designs using foam or cardboard
- Research project on a specific aircraft and its aerodynamic features
- Safety quiz and tool identification exercise
- Practice measuring and marking wood
- Hands-on project: Create a simple wooden project (e.g., a small shelf or birdhouse).
- Measure, cut, and assemble using wood glue and fasteners
- Demonstration of each tool's operation and maintenance
- Practice using each tool on scrap wood in preparation for the final project
- Planning phase: Sketch designs, create materials list, and outline steps
- Execution phase: Build the project using learned techniques and tools
- Presentation: Students will present their final projects to the class, explaining their design and the aerodynamics involved

**Extensions:**

- Aerodynamics simulator
- Instructional videos

**Instructional Methods:**

- Lecture
- Demonstration
- Hands on activities
- Group work
- Peer tutoring
- Video lessons.

## **Materials & Resources:**

- Paper for Airplane Models (various weights)
- Foam Sheets (for wing design experiments)
- Scissors
- Tape and Glue
- Markers (for design and labeling)
- Rulers
- String (for measuring distances)
- Weights (small washers or coins for testing lift)
- Books/Articles on Aerodynamics (age-appropriate texts)
- Videos on Flight Principles (educational platforms like YouTube or educational websites)
- Online Simulation Tools (for aerodynamics experiments)
- Wood (various types such as pine, plywood, or MDF)
- Wood Glue
- Nails and Screws
- Sandpaper (various grits)
- Finishing Supplies (paint, stain, or varnish)
- Miter Saw
- Band Saw
- Jigsaw
- Planer
- Jointer
- Drill Press
- Belt Sander
- Oscillating Spindle Sander
- Disc Sander
- CNC Router
- Laser Engraver
- Safety Glasses
- Hearing Protection
- Dust Masks
- Work Gloves
- Woodworking Reference Books (for techniques and project ideas)
- Instructional Videos (demonstrating the use of woodworking tools)
- CNC and Laser Engraving Software (for designing projects)
- Combination of Wood and Aerodynamics Materials (as needed based on individual project designs)
- Additional Decorative Materials (optional: stickers, decals, etc.)

## **Assessments:**

- Participation in class discussions and activities
- Completion and quality of hands-on projects
- Performance on written tests and safety quizzes
- Quality of final project and presentation skills

## Curriculum Scope & Sequence

**Planned Course:** 8<sup>th</sup> grade Tech Ed

**Unit:** CNC Router and Laser Engraving

**Time frame:** 1-1.5 weeks

**State Standards:** 3.5.6-8.a, 3.5.6-8.b, 3.5.6-8.g, 3.5.6-8.i, 3.5.6-8.j, 3.5.6-8.k, 3.5.6-8.l, 3.5.6-8.m, 3.5.6-8.n, 3.5.6-8.o, 3.5.6-8.p, 3.5.6-8.q, 3.5.6-8.s, 3.5.6-8.t, 3.5.6-8.u, 3.5.6-8.v, 3.5.6-8.w, 3.5.6-8.x, 3.5.6-8.bb, 3.5.6-8.dd, 3.5.6-8.ii, 3.5.6-8.kk

**Core Activities:** Students still complete/participate in the following:

- Hands-on activities: Design a simple project using CNC software and engrave a design on wood
- Discussion on the applications of CNC and laser technology in woodworking

**Extensions:**

- Instructional videos
- Software helper content

**Instructional Methods:**

- Lecture
- Demonstration
- Guided practice

**Materials & Resources:**

- Rulers
- Pencils
- Wood of varying types
- Laser engraver
- CNC Router
- computer
- software
- Woodworking Reference Books (for techniques and project ideas)
- Instructional Videos (demonstrating the use of woodworking tools)

**Assessments:**

- Participation in class discussions and activities
- Completion and quality of hands-on projects
- Performance on written tests and safety quizzes
- Quality of final project and presentation skills

## Curriculum Scope & Sequence

**Planned Course:** 8<sup>th</sup> grade Tech Ed

**Unit:** Safe and proper use of Machines and Hand tools

**Time frame:** 2 weeks

**State Standards:** 3.5.6-8.a, 3.5.6-8.b, 3.5.6-8.g, 3.5.6-8.i, 3.5.6-8.j, 3.5.6-8.k, 3.5.6-8.l, 3.5.6-8.m, 3.5.6-8.n, 3.5.6-8.o, 3.5.6-8.p, 3.5.6-8.q, 3.5.6-8.s, 3.5.6-8.t, 3.5.6-8.u, 3.5.6-8.v, 3.5.6-8.w, 3.5.6-8.x, 3.5.6-8.bb, 3.5.6-8.dd, 3.5.6-8.ii, 3.5.6-8.kk

**Core Activities:** Students still complete/participate in the following:

- Measure, cut, and assemble using wood glue and fasteners.
- Demonstration of each tool's operation and maintenance.
- Practice using each tool on scrap wood in preparation for the final project.
- Safety quizzes and tool identification exercises.
- Practice measuring and marking wood.

**Extensions:**

- Online safety videos
- Text safety instructions
- Youtube videos

**Instructional Methods:**

- Lecture
- Demonstration
- Guided practice

**Materials & Resources:**

- Tape and Glue
- Markers (for design and labeling)
- Rulers
- String (for measuring distances)
- Weights (small washers or coins for testing lift)
- Books/Articles on Aerodynamics (age-appropriate texts)
- Wood (various types such as pine, plywood, or MDF)
- Wood Glue
- Nails and Screws
- Sandpaper (various grits)
- Finishing Supplies (paint, stain, or varnish)
- Miter Saw
- Band Saw
- Jigsaw
- Planer
- Jointer
- Drill Press
- Belt Sander
- Oscillating Spindle Sander
- Disc Sander

- Safety Glasses
- Hearing Protection
- Dust Masks
- Work Gloves
- Woodworking Reference Books (for techniques and project ideas)
- Instructional Videos (demonstrating the use of woodworking tools)
- Combination of Wood and Aerodynamics Materials (as needed based on individual project designs)
- Additional Decorative Materials (optional: stickers, decals, etc.)

**Assessments:**

- Participation in class discussions and activities
- Completion and quality of hands-on projects
- Performance on written tests and safety quizzes
- Quality of final project and presentation skills

# Curriculum Scope & Sequence

**Planned Course:** 8<sup>th</sup> grade Tech Ed

**Unit:** Aerodynamics concepts and Race car project

**Time frame:** 1 week

**State Standards:** 3.5.6-8.a, 3.5.6-8.b, 3.5.6-8.g, 3.5.6-8.i, 3.5.6-8.j, 3.5.6-8.k, 3.5.6-8.l, 3.5.6-8.m, 3.5.6-8.n, 3.5.6-8.o, 3.5.6-8.p, 3.5.6-8.q, 3.5.6-8.s, 3.5.6-8.t, 3.5.6-8.u, 3.5.6-8.v, 3.5.6-8.w, 3.5.6-8.x, 3.5.6-8.bb, 3.5.6-8.dd, 3.5.6-8.ii, 3.5.6-8.kk

**Core Activities:** Students still complete/participate in the following:

- Simple experiments with paper airplanes to demonstrate lift and drag.
- Group discussion on how different designs affect flight performance.
- Hands-on project: Build and test different wing designs using foam or cardboard.
- Research project on a specific aircraft and its aerodynamic features.
- Planning phase: Sketch designs, create materials list, and outline steps.
- Execution phase: Build the project using learned techniques and tools.

**Extensions:**

- Aerodynamics simulator
- Youtube videos

**Instructional Methods:**

- Lecture
- Demonstration
- Guided practice

**Materials & Resources:**

- Books/Articles on Aerodynamics (age-appropriate texts)
- Videos on Flight Principles (educational platforms like YouTube or educational websites)
- Online Simulation Tools (for aerodynamics experiments)
- All tools previously mentioned
- Project instructions

**Assessments:**

- Participation in class discussions and activities
- Completion and quality of hands-on projects
- Performance on written tests and safety quizzes
- Quality of final project and presentation skills

# Curriculum Scope & Sequence

**Planned Course:** 8<sup>th</sup> grade Tech Ed

**Unit:** Finish techniques, project completion time

**Time frame:** 2-3 weeks

**State Standards:** 3.5.6-8.a, 3.5.6-8.b, 3.5.6-8.g, 3.5.6-8.i, 3.5.6-8.j, 3.5.6-8.k, 3.5.6-8.l, 3.5.6-8.m, 3.5.6-8.n, 3.5.6-8.o, 3.5.6-8.p, 3.5.6-8.q, 3.5.6-8.s, 3.5.6-8.t, 3.5.6-8.u, 3.5.6-8.v, 3.5.6-8.w, 3.5.6-8.x, 3.5.6-8.bb, 3.5.6-8.dd, 3.5.6-8.ii, 3.5.6-8.kk

**Core Activities:** Students still complete/participate in the following:

- Complete the cnc Router project
- Cut out student name or initials
- Construct a small project using wood and plastic
- Use the spray booth and paint to complete all projects
- Presentation: Students will present their final projects to the class, explaining their design

**Extensions:**

- Instructional videos
- Youtube videos

**Instructional Methods:**

- Lecture
- Demonstration
- Guided practice

**Materials & Resources:**

- Spray booth
- Spray paint
- Hand paint
- Brushes
- Safety glasses
- Respirator ( if needed)

**Assessments:**

- Participation in class discussions and activities
- Completion and quality of hands-on projects
- Performance on written tests and safety quizzes
- Quality of final project and presentation skills