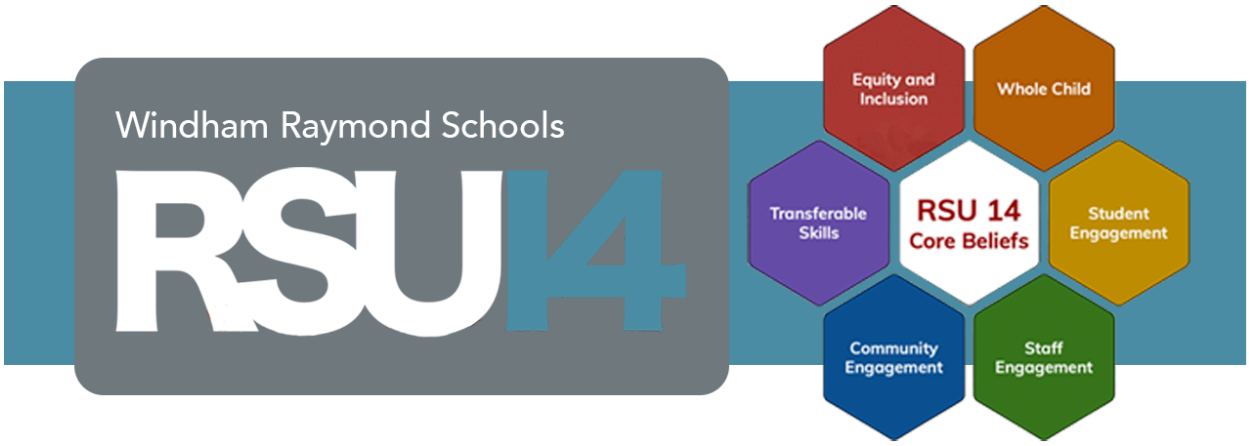

Curriculum Guide

Department: Science and Technology

Course Name: Engineering & Design

This course will allow students to gain knowledge and skills that are necessary to be successful in any career; problem-solving, teamwork, critical thinking, and technical processes will be explored. Students will develop problem-solving skills and apply their knowledge of research and design to create solutions to real-world engineering problems.

0.5 CREDITS

Maine Learning Results - Science and Engineering

RSU14 staff use the Maine State Learning Results to craft each course of study. The below standards and targets are aligned and are updated when changes are made at the state level.

Graduation Standards for course:

Design and Produce Artifacts: Design and produce artifacts with broad accessibility and usability.

- ☐ I can plan the development of an artifact, taking time, resource constraints, and user expectations into account.
- ☐ I can modify an existing artifact to increase optimization or productivity.
- ☐ I can design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through the various fields of technology.

Evaluate and Refine Artifacts: Apply scientific and engineering ideas to evaluate and refine an artifact that optimizes the design for human needs and wants.

- ☐ I can evaluate and refine an artifact multiple times to enhance performance, reliability, usability, and accessibility.
- ☐ I can identify and fix errors using a systemic process.
- ☐ I can make design changes based on results and interpretation of data.

Obtain, Evaluate, and Communicate Information: Apply effective research strategies and communicate complex ideas clearly and effectively.

- ☐ I can select, organize, and interpret data from multiple sources to support a claim.
- ☐ I can employ effective research strategies to locate information and other resources for creative pursuits.
- ☐ I can collect, analyze, and represent data in a variety of ways to facilitate problem-solving and decision-making.
- ☐ I can collaborate effectively to cultivate relationships with individuals with diverse perspectives and skills.

21st Century Skills/Guiding Principles for course:

A Clear and Effective Communicator who:

- ☐ Uses evidence and logic appropriately in communication
- ☐ Adjusts communication based on the audience
- ☐ Uses a variety of modes of expression (spoken, written and visual and performing including the use of technology to create and share)

A Self-Directed and Lifelong Learner who:

- ☐ Recognizes the need for information and locates and evaluates resources
- ☐ Applies knowledge to set goals and make informed decisions
- ☐ Applies knowledge in new contexts
- ☐ Uses interpersonal skills to learn and work with individuals from diverse backgrounds

An Integrative and Informed Thinker who:

- ☐ Gains and applies knowledge across disciplines and learning contexts and to real-life situations with and without technology
- ☐ Evaluates and synthesizes information from multiple sources
- ☐ Applies ideas across disciplines
- ☐ Applies systems thinking to understand the interaction and influence of related parts on each other and on outcomes

A creative and practical problem solver who:

- ☐ Observes and evaluates situations to define problems
- ☐ Frames questions, makes predictions and designs data/information collection and analysis strategies

- ☐ Uses information and technology to solve problems
- ☐ Generates a variety of solutions, builds a case for a best response and critically evaluates the effectiveness of the response
- ☐ Perseveres in challenging situations

Curriculum Activities/ Units may include:

Mechanical Drawing
AutoCAD
Engineering Design Process
Rubber band Cars
Renewable Energy - Wind Blades
Magnetic Levitation
Career Research
Simple Machines
Boats

Curriculum Materials may include:

Drafting Tools
3D Printer
Balsa Wood
Glue Guns & Sticks
TinkerCAD
OnShape