



Gateway: Design & Modeling 6th-7th Grade

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Approved by the Board of Education
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COURSE TITLE: Gateway – Design & Modeling

GRADE LEVEL: 6th Grade – 7th Grade

CONTENT AREA: Career and Technical Education

Course Description:

In Gateway-Design & Modeling, students apply the design process to solve problems and understand the influence of creativity and innovation in their lives. They work in teams to design a playground and furniture, capturing research and ideas in their engineering notebooks. Using Autodesk design software, students create a virtual image of their designs and produce a portfolio to showcase their innovative solutions.

Taken from www.pltw.org

Course Rationale:

Through topics like robotics, flight and space, and DNA and crime scene analysis, middle school students engage their natural curiosity and imagination in creative problem solving. PLTW's Gateway program is a strong foundation for further STEM learning in high school and beyond, challenging students to solve real-world challenges, such as cleaning oil spills and designing sustainable housing solutions. Using the same advanced software and tools as those used by the world's leading companies, students learn how to apply math, science, technology, and engineering to their everyday lives.

Taken from www.pltw.org

Course Scope and Sequence

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| Unit 1: What is Engineering (7 days) | Unit 2: Design Process (5 days) | Unit 3: Measurement (5 days) |
| Unit 4: Sketching and Dimensioning Techniques (6 days) | Unit 5: Designing for Production (22 days) | |

Essential Terminology/Vocabulary

Unit 1: agriculture, artifact, biotechnology, communication, construction, energy, engineering, environment, ergonomics, industrial, innovation, invention, manufacturing, math, nanotechnology, process, science, system, technology, transportation

Unit 2: aesthetics, annotate, brainstorming, constraints, consumer, criteria, decision matrix, design, design brief, design elements, design process, designer, dimension, engineer, ergonomics, evaluate, experimentation, exponentially, investigate, model, modify, optimize, problem solving, process, prototype, requirements, research, specification, testing, texture, trade off, visualization

Unit 3: accuracy, caliper, customary system, denominator, diameter, measurement, metric system, micrometer, numerator, precision, unit

Unit 4: annotation, centerline, construction line, depth, diameter, dimension, dimension line, extension line, height, hidden line, isometric, leader line, line conventions, line weight, location dimension, object line, one point perspective, orthographic projection, perspective drawing, plane, radius, scale, size dimension, sketch three dimensional, thumbnail sketch, two dimensional, two point perspective, vanishing point, views, visualize, width

Unit 5: annotate, browser, CAD, chamfer, coincident, collinear, concentric, constraint, counterbore, countersink, design, dimension constraint, documentation, edit, extend, feature, fillet, fabricate, fix, functional, geometric constraints, horizontal, isometric, mockup, model, offset, parallel, perpendicular, polygon, profile, prototype, revolve, right triangle, rotation, sketch plane, specification, tangent, trim, vertical

Approved Course Materials and Resources:

- Gateway to Engineering: Rogers, Wright, Yates, ©2010 ISBN-13: 978-1-4180-6178-4
- Project Lead the Way's *Learning Management System (LMS)*
- Gateway VEX Kit