

School District of Loyal

3D Printing

Grade: 9-12

Student Learning Targets



Students who demonstrate understanding can:		
WI State Standards	Standard:	Student Learning Targets:
TE.ENG.1.A TE.ENG.6.E	Students will understand additive manufacturing technologies, components, applications, benefits, and limitations.	Students will be able to: • Identify common 3D printing technologies, machines, components, and vocabulary. • Explain the advantages and limitations of additive manufacturing. • Identify situations in which 3D printing may reduce time, cost, or material use. • Explain current industry applications and potential future uses of 3D printing.
TE.ENG.2	Students will use computer-aided design software to create and prepare printable three-dimensional models.	Students will be able to: • Create a 3D model from basic shapes and sketches using CAD software. • Use the X, Y, and Z planes, dimensions, scale, and alignment to construct a model. • Evaluate a model for printability, including wall thickness, supports, openings, and gaps. • Save, export, and prepare a completed CAD model for slicing.
TE.ENG.6.E	Students will apply additive manufacturing processes to prepare, produce, and evaluate three-dimensional prints.	Students will be able to: • Import, orient, slice, save, and upload a model for printing. • Select and adjust print settings such as layer height, speed, infill, supports, and scale. • Use materials and equipment safely and responsibly during the printing process. • Evaluate print quality, troubleshoot problems, and revise the model or settings as needed.
TE.ENG.2 TE.ENG.6.E	Students will modify existing digital models and use 3D scanning to support reverse engineering and design improvement.	Students will be able to: • Locate, download, and modify an existing 3D model to meet a specific need. • Scan an existing object and convert the scan into a usable digital model. • Explain the benefits and limitations of 3D scanning and reverse engineering. • Edit, export, slice, and prepare a scanned or modified model for printing.

TE.ENG.2 TE.ENG.6.E	Students will apply advanced CAD concepts to develop accurate models, assemblies, and mechanical systems.	Students will be able to: • Translate a two-dimensional drawing or prototype into a three-dimensional CAD model. • Use precise dimensions, planes, constraints, and design features to improve accuracy. • Create models with movable or interacting parts, such as gears, wheels, hinges, or joints. • Evaluate clearances, fit, movement, strength, and function before and after printing.
TE.ENG.2 TE.ENG.6.A	Students will use the engineering design and product development process to create solutions for authentic needs.	Students will be able to: • Identify and evaluate a real-world need or problem that may be addressed through 3D printing. • Use design thinking to research, brainstorm, sketch, and select a possible solution. • Create, prepare, and print a functional prototype from an original design. • Test, evaluate, communicate, and refine the design based on evidence and user needs.