3D ENGINEERING AND PRINTING CHALLENGES

Learner Objectives:

By the end of this unit, students will be able to:

- Gather, analyze, and apply information about engineering and 3D design and print including, but not limited to, the following topics: calculating area, calculating linear measurement, drawing to scale.
- Apply math problem solving strategies to real-life situations.
- Generate 3D designs using Google Sketchup and print the objects they designed in 3D.
- Work responsibly as an individual, group member, and leader when analyzing problems associated with 3D design
- Apply and analyze appropriate research skills when investigating the advancements 3D printers have made in real-world situations.

Show-Me Standards
Knowledge Standards:

Math 1	addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations
Math 2	geometric and spatial sense involving measurement (including length, area, volume), trigonometry, and similarity and transformations of shapes
Math 4	patterns and relationships within and among functions and algebraic, geometric and trigonometric concepts
Math 6	discrete mathematics (such as graph theory, counting techniques, matrices)

CA 1	speaking and writing standard English (including grammar, usage, punctuation, spelling, capitalization)
CA 3	reading and evaluating nonfiction works and material (such as biographies, newspapers, technical manuals)
CA 4	writing formally (such as reports, narratives, essays) and informally (such as outlines, notes)
CA6	participating in formal and informal presentations and discussions of issues and ideas
Science 1	properties and principles of matter and energy
Science 8	impact of science, technology and human activity on resources and the environment
SS 5	the major elements of geographical study and analysis (such as location, place, movement, regions) and their relationships to changes in society and environment

Performance Standards:

Goal 1.1	develop questions and ideas to initiate and refine research
Goal 1.2	conduct research to answer questions and evaluate information and ideas
Goal 1.4	use technological tools and other resources to locate, select and organize information
Goal 1.6	discover and evaluate patterns and relationships in information, ideas and structures
Goal 1.8	organize data, information and ideas into useful forms (including charts, graphs, outlines) for analysis or presentation
Goal 1.10	apply acquired information, ideas and skills to different contexts as students, workers, citizens and consumers
Goal 2.1	plan and make written, oral and visual presentations for a variety of purposes and audiences

Goal 2.3	exchange information, questions and ideas while recognizing the perspectives of others
Goal 2.4	present perceptions and ideas regarding works of the arts, humanities and sciences
Goal 2.5	perform or produce works in the fine and practical arts
Goal 2.6	apply communication techniques to the job search and to the workplace
Goal 2.7	apply communication techniques to the job search and to the workplace
Goal 3.1	identify problems and define their scope and elements
Goal 3.2	develop and apply strategies based on ways others have prevented or solved problems
Goal 3.3	**develop and apply strategies based on one's own experience in preventing or solving problems**
Goal 3.4	evaluate the processes used in recognizing and solving problems
Goal 3.6	examine problems and proposed solutions from multiple perspectives
Goal 3.8	assess costs, benefits and other consequences of proposed solutions
Goal 4.1	explain reasoning and identify information used to support decisions
Goal 4.4	recognize and practice honesty and integrity in academic work and in the workplace
Goal 4.5	develop, monitor and revise plans of action to meet deadlines and accomplish goals
Goal 4.6	identify tasks that require a coordinated effort and work with others to complete those tasks