STUDENT LEARNING GOALS/OBJECTIVES DEVELOPMENT GUIDE

Grade: 9-12
Content Area: Engineering

Component	Guiding Questions	Descriptors
Baseline/Trend Data	*What data were reviewed to assist in establishing the student learning goal/objective?*	• Over the past three years students in Engineering 1 course have done poorly on standard number: *25.Identify the components of the design process: define the problem, brainstorm, research, develop solutions, prototype, test/evaluate, and communicate results.* Only 25% of the students have met goal. • Pre-assessment scores for the past two years have return the following results: 25% of students scored between 0-10 points on the *Engineering Design Rubric* 70% of students scored between 11-19 points on the *Engineering Design Rubric* 5% of students scored between 20-30 points on the *Engineering Design Rubric*
Student Population	*Who is included in this student learning goal/objective? Why is this target group/class selected?*	Students in this course have little prerequisite knowledge of the engineering design process. This assessment challenge will measure content knowledge as well as the application of content within a problem-based setting. Class consist of two ELL students; one student with an IEP, five gifted students; and 12 students with no special designation
Standards And Learning Content	*Which standards are connected to the learning content?*	Connecticut Technology Education, Engineering Standards: • *ENG.02 Use the design process to solve problems by creating and refining prototypes.* • *ENG.03 Ensure quality control using the major components of manufacturing processes including measurement systems, tools and instruments to produce a product.* • *ENG.04Design using the appropriate materials in engineering by identifying. Comparing, selecting and testing.* Connecticut Performance Standards & Competencies Standard: • *25. Identify the components of the design process: define the problem, brainstorm, research, develop solutions, prototypes, test/evaluate, and communicate results.* Common Core State Standards in English/Language Arts: • *RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.* • *RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.* • *WHST.11-12.2a Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.*

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Student Learning Goal/Objective Statement	*What is the expectation for student growth and development?*	Students will demonstrate the engineering design process. Students will be able to apply the engineering design process to a real-world problem. Students will communicate their solutions using the engineering design process for a real-world problem.
Indicators Of Academic Growth And Development (IAGDs) **Growth Targets**	A. *How will you measure progress toward your student learning goal/objective?* B. *What targets will you establish to demonstrate attainment of your student learning goal/objective?* NOTE: If teacher sets only one goal/objective then there MUST be at least two IAGDs	**IAGDs:** • **ASSESSMENTS/MEASURES OF PROGRESS** Student Performance progress will be measured by: • Engineering design process assignments • Group design challenge • Scores on group design challenge • Practice CTE Engineering Assessment **B. GROWTH TARGETS** • 80% will raise their scores a minimum of 10 points on the *Engineering Design Rubric* • 80% of students will be "at target" on the *Engineering Design Rubric* • 70% of students will meet goal on Connecticut CTE Engineering Assessment Standard #25
Instructional Strategies/Supports	*What methods will you use to accomplish this student learning goal/objective? How will progress be monitored? What professional learning/supports do you need to achieve this student learning goal/objective?*	Teaching strategies will include: • Group activities • Scaffold Instruction • Peer Coaching • Provide multiple means of expression to insure that students have comprehended and can apply content • Guided discovery • Educational Aides will work with special education student to modify the lessons as appropriate; rubric will be adjusted to accommodate the students' learning curve. • Language learners will be given written instructions in both English and their native language, Spanish

Engineering Design Rubric

Student Name: Date:

Category	Below Target (0 points)	At Target (2 points)	Above Target (3 points)	Points Earned
Defining the Problem	Rephrases the problem with limited clarity	Rephrases the problem clearly	Rephrases the problem clearly and precisely	
Brainstorming a Solution	Contributes few or implausible ideas	Contributes a plausible idea	Contributes multiple plausible ideas	
Generating Ideas	Contributes ideas Produces incomplete sketches Does not present a concept	Contributes one plausible idea Produces marginally accurate pictorial and orthographic sketches of design concepts	Contributes multiple plausible ideas Produces accurate pictorial and orthographic sketches of design concepts	
Identifying Criteria	Does not restate the criteria clearly and fails to identify constraints	Restates the criteria clearly and identifies several constraints	Restates the criteria clearly and precisely and identifies many constraints	
Exploring Possibilities	Inadequately analyzes the pluses and minuses of a variety of possible solutions	Satisfactorily analyzes the pluses and minuses of a variety of possible solutions	Thoroughly analyzes the pluses and minuses of a variety of possible solutions	
Selecting an Approach	Selection of solution is not based on consideration of criteria and constraints	Selects a promising solution based on criteria and constraints	Selects a promising solution based on a thorough analysis criteria and constraints	
Making a Model or Prototype	Prototype meets the task criteria to a limited extent	Prototype meets the task criteria	Prototype meets the task criteria in insightful ways	
Testing and evaluating the Design	Testing and evaluation processes are inadequate	Testing and evaluation processes are adequate for refining the problem solution	Testing processes are innovative	
Refining the Design	Refinement based on testing and evaluation is not evident	Refinements made based on testing and evaluation results	Significant improvement in the design is made based on prototype testing and evaluation	
Communicate processes or results	Presentation provides a complete record of planning, construction, testing, modifications, reasons for modifications, and detailed reflection about the strategies used and the results.	Presentation provides quite a bit of detail about planning, construction, testing, modifications, and reasons for modifications.	Presentation lacks detail about planning, construction, testing, modifications, and reasons for modifications.	
Final Score (30 pts. possible)				