Lesson Identification and TEKS Addressed	
Career Cluster	Science, Technology, Engineering & Mathematics
Course Name	Principles of Applied Engineering
Lesson/Unit Title	Rubber Band Airplane
TEKS Student Expectations	**§130.402. (c) Knowledge and Skills** (6) The student thinks critically and applies fundamental principles of system modeling and design to multiple design projects. The student is expected to: (A) identify and describe the fundamental processes needed for a project, including the design process and prototype development, and initiating, planning, executing, monitoring and controlling, and closing a project; (B) identify the chemical, mechanical, and physical properties of engineering materials; (C) use problem-solving techniques to develop technological solutions; (D) use consistent units for all measurements and computations; and (E) assess the risks and benefits of a design solution.
Basic Direct Teach Lesson (Includes Special Education Modifications/Accommodations and one English Language Proficiency Standards (ELPS) Strategy)	
Instructional Objectives	After completing this lesson, students will be able to design and construct a rubber band airplane, test the planes to determine which designs are most efficient, analyze the relationship between distance and variables of the plane (wings, weight, fins, center of gravity, etc.) and document the results on the Airplane Design Test Report • Design a rubber band plane using set materials

***** Special Education Modifications or Accommodations, if applicable

	• Apply cause and effect relationships of size, air resistance, shape, and balance that affect the plane's flight • Create their own unique rubber band airplane • Apply critical thinking on how to build the airplane
Rationale	Design, weight, and power are factors in planes and travel pattern and duration.
Duration of Lesson	1-2 hours
Word Wall/Key Vocabulary *(ELPS c1a,c,f; c2b; c3a,b,d; c4c; c5b) PDAS II(5)*	
Materials/Specialized Equipment Needed	**Materials** • Paper, pencil, Plane kit or basic balsa wood supplies, rubber bands, and a propeller • Tape, glue, clay, some type of mount for the propeller • Computer, overhead projector
Anticipatory Set (May include pre-assessment for prior knowledge)	Discuss rubber band powered airplane designs. Ask: What might be of importance to consider when designing such a plane?
Direct Instruction *	Show PowerPoint presentation, use lesson outline, and notes page; *Individualized Education Plan (IEP) for all special education students must be followed. Examples of accommodations may include, but are not limited to:* none
Guided Practice *	Assist students in building planes. Discuss performance of planes. *Individualized Education Plan (IEP) for all special education students must be followed. Examples of accommodations may include, but are not limited to:* none
Independent Practice/Laboratory Experience/Differentiated Activities *	Have each student determine why his/her plane flew as it did and write a report. Also have them write a paragraph about what they would do differently. Students may write a hypothesis about what part of the plane is the biggest factor in how far the plane traveled. Challenge: Loop and spiral planes

* Special Education Modifications or Accommodations, if applicable

	Individualized Education Plan (IEP) for all special education students must be followed. Examples of accommodations may include, but are not limited to: none
Lesson Closure	Review why planes flew as they, which planes flew the best, and what could have been done differently to improve the flights.
Summative/End of Lesson Assessment *	Airplane Design Test Report *Individualized Education Plan (IEP) for all special education students must be followed. Examples of accommodations may include, but are not limited to:* none
References/Resources/ Teacher Preparation	Understand how to build a rubber band airplane and the factors that will ultimately affect its performance. This project relates design, drafting, and physics since students will be considering basic physics principles. http://www.midwestproducts.com/
Additional Required Components	
English Language Proficiency Standards (ELPS) Strategies	
College and Career Readiness Connection[1]	
Recommended Strategies	
Reading Strategies	
Quotes	
Multimedia/Visual Strategy Presentation Slides + One Additional Technology Connection	
Graphic Organizers/Handout	

[1] Visit the Texas College and Career Readiness Standards at http://www.thecb.state.tx.us/collegereadiness/CRS.pdf, Texas Higher Education Coordinating Board (THECB), 2009.

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Writing Strategies Journal Entries + 1 Additional Writing Strategy	
Communication 90 Second Speech Topics	
Other Essential Lesson Components	
Enrichment Activity (e.g., homework assignment)	
Family/Community Connection	
CTSO connection(s)	SkillsUSA
Service Learning Projects	
Lesson Notes	

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