

Unit 1 Project -Cargo Glider (adapted from MESA)

Name: _____ Due Date :September 19, 2025 [Parent Acknowledgement Form](#)

Standards

MS-ETS1-1: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

MS-ETS1-2: Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

MS-ETS1-3: Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

MS-ETS1-4: Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Objective:

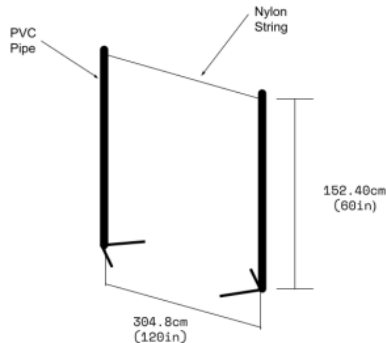
In groups of 2, students will design and construct a cargo glider capable of carrying two 1-star ping pong balls (payload) and flying over an obstacle before landing the farthest distance possible.

TO EARN A GRADE, your project must include the following components, in addition to timeline checkpoints:

- Design and construct a cargo glider.
- Complete an engineering notebook.
- Present your project to class using *Flip* or Youtube.

Glider Rules

1. Various materials may be used to build the glider; materials are not limited to wood. Students should consider the strength of the material needed to withstand the force of the launcher. There is no restriction to the size and/or weight of the glider.
2. Remote control or additional power sources are not allowed.
3. Gluing or taping balls to the glider or each other is acceptable as long as teams can show the judges that balls have not been modified and the one star marking is visible.
4. The glider **MUST** fly over the 60-inch obstacle and **MUST** stay within the 10-foot width of the obstacle.



CHECKPOINTS

You will need to record and submit your progress on Schoology regularly. This is a part of your grade. Show your teacher what you have been working on. It is recommended that you keep a log and take pictures of your work. Simply telling the teacher what you have done does not count. You need to provide evidence.

Here are the checkpoint dates and suggested completed activities:

August 22, Friday- Sign Parent Acknowledgement Form

August 28, Thursday - Preliminary Blueprint. Teacher approval required before building.

September 5, Friday- Building and testing.

September 12, Friday- Submit revision/additions. Continue building, testing and prepare for presentation

September 19, Friday- Submit project, engineering log and video presentation.

Engineering Log

The purpose of the Engineering Lab Book is for students to better understand the process an engineer goes through in the creation of a project. This project is not designed to be completed in a single class period or day, but to be the result of thoughtful research, planning, analysis and evaluation. Keeping a lab book throughout the design process will help to keep one on track, using a logical progression of planning, in order to develop their project efficiently. Use this [Sample Engineering Lab report](#) and [Engineering Lab Book Blank Template](#).

Presentation

Your presentation should be clear, engaging, and well-organized. You will need to effectively communicate your design process, the challenges you faced, and the solutions you developed. You can present your engineering project through FLIP or YouTube. Be sure to clearly demonstrate how your project fulfills the necessary criteria.

TIPS

Students:

- If the project seems too difficult or time consuming, think of new ways to make a step work which will require less energy or time. Sometimes the design is flawed or too complicated.
- Set goals and timelines. Complete one goal before moving onto the next goal.
- Look for things that are already built and can be modified for your use.
- If a specific step does not work from your original plans, you may need to re-design that step. Be sure to get approval for all new additions to your project at the revision checkpoint.
- Communicate your needs and responsibilities with your family.

Parents:

- There may be frustration - encouragement and support are key!
- Please supervise your child, especially if using tools.
- This is a student-based project. Please guide them rather than doing it for them.
- Help plan a schedule so your child does not wait until the last minute to complete the project.
- This project will not be graded on aesthetics, but rather the creative functionality of the contraption.
- Keep cost to a minimum!

Resources:

[Overview](#)

RUBRIC

	Exemplary 4	Proficient 3	Developing 2	Needs Improvement 1
Engineering Design & Creativity (16 pts)	Design demonstrates innovative thinking, is highly functional, and effectively solves the problem. Clear and thoughtful consideration of multiple solutions.	Design is functional and addresses the problem effectively. Some evidence of creative problem-solving.	Design addresses the problem but lacks creativity or a detailed approach. Some functionality is evident.	Design is incomplete or does not effectively solve the problem. Lacks creativity and detail.
Engineering Log & Documentation (12 pts)	Log is thorough, organized, and clearly documents every step of the design process. Includes sketches, notes, data, and reflections.	Log is well-organized and covers most steps of the design process with relevant documentation and reflections.	Log is somewhat organized but lacks detail. Some steps in the design process are missing or not well-documented.	Log is disorganized or incomplete, with little to no documentation of the design process.
Presentation & Communication (12 pts)	Presentation is clear, engaging, and well-organized. Students effectively communicate the design process, challenges, and solutions.	Presentation is clear and organized. Students communicate the design process and outcomes effectively.	Presentation is somewhat clear but may lack organization or detail. Communication of the design process and outcomes is adequate.	Presentation is unclear or disorganized. Students struggle to communicate the design process and outcomes effectively.
Adherence to Design Specifications & Requirements (8 pts)	Project fully meets or exceeds all specified criteria and requirements. All design constraints and specifications are carefully followed.	Project meets most specified criteria and requirements, with minor deviations from the design constraints.	Project meets some of the specified criteria and requirements, with noticeable deviations from the design constraints.	Project does not meet the specified criteria and requirements, with significant deviations from the design constraints.

