

Rover Payload Support Structure Challenge

Unit 2 Project Brief

Engineering Scenario

A rover must carry payloads, sensors, batteries, and mission tools while staying light enough to move efficiently and strong enough to survive testing.

Design Goal

Design, fabricate, and test a lightweight support structure that balances strength, stiffness, mass, material choice, and manufacturability.

Criteria	<ul style="list-style-type: none"> Structure supports the required payload without unsafe failure. Design shows thoughtful use of geometry, material properties, and load paths. Testing includes measured mass, load, deflection, and observations. Final claim explains strength-to-weight performance.
Constraints	<ul style="list-style-type: none"> Use approved classroom materials and fabrication tools. Structure must fit within the teacher-provided size envelope. Teams must document setup and safety before load testing.
Required Evidence	<ul style="list-style-type: none"> Annotated sketches or CAD concept Material and geometry rationale Load-test setup diagram Data table with repeated measurements Failure mode or limitation analysis
Checkpoints	<ul style="list-style-type: none"> Analyze loads and constraints Choose a structural concept Build and inspect prototype Run load/deflection tests Defend the structure using evidence

Final Design Review Expectations

Your final review should clearly connect the problem, evidence, prototype decisions, testing results, limitations, and next recommended improvement. Strong teams show how data changed the design rather than only describing what they built.

Student Deliverable Reminder

Keep all sketches, calculations, data tables, photos, revision notes, and decisions in your engineering notebook or assigned project packet. The notebook should make your design process visible.