

IED 1.8 | Engineering Documentation Challenge

Unit 1 Final Challenge | Student Packet



LockwoodSTEM

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NAME: _____ PERIOD: _____ DATE: _____

MISSION BRIEF

Use evidence, not guessing

You will document a small purpose-made assembly so another engineering team could understand, reproduce, inspect, and improve it. The physical assembly is your source of evidence. Your final package should communicate the design clearly without requiring a verbal explanation.

DRIVING QUESTION

How can an engineer fully communicate an existing assembly so another person could reproduce it without guessing?

Your documentation must combine sketching, views, dimensions, measurement, tolerance reasoning, and interface analysis.

FINAL DELIVERABLE

- isometric overview sketch
- aligned front/top/right-side views
- complete dimensions for selected part or assembly features
- measurement and tolerance evidence
- joining/interface analysis
- one justified improvement idea
- peer review and final revision check

CHALLENGE RULES

Keep your work neat enough for another team to use

1. Measure the actual assembly before finalizing critical dimensions.
2. Do not dimension from memory or guess at hidden features.
3. Use proper line conventions, centerlines, hidden lines, and dimension placement.
4. Avoid repeated dimensions. Every important feature should be sized and located.
5. Use tolerances only where they help control function, fit, alignment, or assembly.
6. Your improvement must be based on evidence from the existing design.

ASSEMBLY SNAPSHOT

Complete this before detailed documentation

Assembly name or station ID: _____

Primary function of the assembly: _____

Main parts you can identify: _____

Most important interface or connection: _____

IED 1.8 | Product Investigation

Observe the assembly before drawing it

NAME: _____

PERIOD: _____

DATE: _____

PARTS AND INTERFACES

Identify how the assembly is built

Part ID	Part name/description	Material/process	Function in assembly	Quantity
A				
B				
C				
D				

INTERFACE MAP

Where do parts touch, connect, align, or move?

Interface	Parts involved	What connects them?	What must it do?	Evidence observed
1				
2				
3				
4				

ISOMETRIC OVERVIEW SKETCH

Show the full assembly in one clear view

ISOMETRIC SKETCH SPACE



Label major parts and important interfaces.

Create aligned views using proper line conventions



NAME: _____

PERIOD:

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Choose the views that best communicate the assembly

Front view chosen because:

Top view should show:

Right-side view should show:

Hidden or center lines needed for:

Align Front, Top, and Right-side views

RIGHT-SIDE VIEW

Keep views aligned where possible.

Line up features with the front view.

IED 1.8 | Measurement and Dimensioning

Size and locate the features another team needs

NAME: _____ PERIOD: _____ DATE: _____

MEASUREMENT RECORD

Measure before final dimension decisions

Feature measured	Tool used	Trial 1	Trial 2	Trial 3	Reported value

CRITICAL DIMENSIONS AND TOLERANCES

Choose dimensions that control function or fit

Critical feature	Nominal value	Tolerance	Why it matters	What happens if it is wrong?

Dimensioning check: Every feature needed to reproduce the design is sized and located. No dimensions are repeated unnecessarily.

IED 1.8 | Interface and Joining Analysis

Explain how the assembly works, not just what it looks like

NAME: _____ PERIOD: _____ DATE: _____

JOINING / INTERFACE ANALYSIS

Use the decision factors from Lesson 1.7

Connection	Joining method	Removable?	Function	Best reason for method	Concern/limitation

ENGINEERING IMPROVEMENT PROPOSAL

Base your idea on evidence from the existing assembly

Problem or opportunity observed: _____

Evidence from your measurements, sketches, or interface analysis: _____

Proposed design change: _____

How the change improves function, assembly, serviceability, or manufacturability: _____

Sketch of proposed improvement:

IMPROVEMENT SKETCH



Label what changed.

IED 1.8 | Peer Review and Final Check

Could another team reproduce this without guessing?

NAME: _____ PERIOD: _____ DATE: _____

PEER ENGINEERING REVIEW

Reviewer completes this section

1. The assembly purpose is clear.

☐

2. Major parts are identified and labeled.

☐

3. Views are aligned and use correct line types.

☐

4. Features are sized and located without obvious missing dimensions.

☐

5. Critical dimensions and tolerances are reasonable.

☐

6. Joining/interface analysis explains how the assembly works.

☐

7. The improvement proposal is supported by evidence.

☐

Reviewer name:

One strength of this documentation package:

One specific revision needed before final submission:

FINAL SUBMISSION RUBRIC

Use this before turning in your package

Category	Points	What strong work includes
Sketching and views	20	Clear isometric sketch; aligned orthographic views; correct line conventions
Dimensioning	20	Complete sizes and locations; proper symbols; no repeated or missing key dimensions
Measurement and tolerances	20	Accurate records; critical dimensions; tolerances tied to function or fit
Joining/interface analysis	15	Connection method, parts involved, function, and tradeoffs explained
Improvement proposal	15	Evidence-based change with clear sketch and justification
Professional quality	10	Neat, organized, labeled, readable, and complete

Final revision completed by: