STEM Wars 2026

CAD Design Challenge - Reverse It!

Challenge Overview:

Students will put their engineering instincts to the test by selecting a real-world mechanical object/product and recreating it using your choice of 3D design CAD software. You will also add a new/improved feature to your object/product to improve its design/function.
Students must carefully measure, analyze, and reverse-engineer their chosen item, producing a fully scaled and professionally organized CAD drawing.

The goal: demonstrate precision, technical comprehension, and the ability to communicate design intent through accurate digital modeling.

Design Requirements:

1. Select a mechanical object with **at least one (1)** moving or interlocking component.
2. Add **at least one (1) new/improved feature** to your object/product.
3. Reverse engineer the object by measuring all relevant dimensions with accuracy.
4. Create a 3D CAD model of the object using your choice of 3D CAD software.
5. Ensure the model is to scale, matching the real object's dimensions.

Submission Requirements:

1. Required views, printed on paper or digital at event:
    - Isometric (3D) Assembled view of object
    - Orthographic Views: Front, top, and side projections
    - *Optional: Exploded view (showing individual components)
2. Provide a brief design summary (50-150 words) explaining the object's function, how it was measured, what you improved, and any assumptions made during reconstruction.
3. Bring the selected object/product (if able to).

Event Coordinator:

- Ed Garner (Technology Teacher – Falconer MS/HS
- egarner@falconerschools.org
- Please contact him with any questions.

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Student Name:_____ **Object/Product:**_____

Grading Rubric:

Grading Criteria	4	3	2	1
Object/Product Selection & Complexity	Object has ≥3 moving/interlocking components; demonstrates appropriate complexity for skill level	Object has 3 components; moderately complex	Object has 2–3 components; simple design	Object has <2 components; overly simple
Measurement Accuracy	All dimensions accurately measured; measurements clearly documented; no significant errors	Most dimensions accurate; minor errors that do not affect model significantly	Some dimensions inaccurate; errors affect model integrity	Many dimensions inaccurate; model does not match real object
3D CAD Modeling & Scale	3D model fully matches real object's scale; all components properly modeled; smooth, professional modeling	3D model mostly matches scale; minor errors in proportions or detail.	Model partially matches scale; several errors in proportions or detail	Model does not match scale; components poorly modeled
Technical Drawings & Views	All required views (isometric + front, top, side) clear and organized; optional exploded view enhances clarity; well-labeled	Required views present; minor clarity or labeling issues	Some views missing or unclear; labels incomplete	Views missing or illegible; unorganized
Design Summary & Presentation	Clear, concise 50–150 word summary; explains function, measurement methods, and assumptions; professional overall presentation	Summary present; minor clarity issues; presentation mostly organized	Summary incomplete or unclear; presentation somewhat disorganized	No summary or extremely vague; poor presentation

Score: _____/20