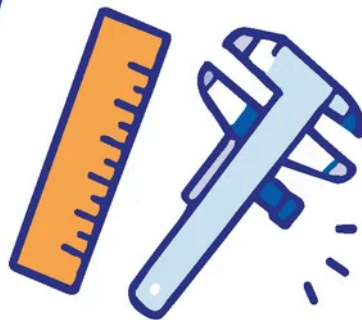


Museum on the Move!



Design • Build • Create

Teacher Guide



Welcome to the Museum on the Move

This guide is designed to help you facilitate a smooth, highly educational experience for your students. The stations are modeled after real manufacturing activities—from initial design to testing and quality checks.

Here is your teacher's guide to prepare your students and maximize learning at each station of the exhibit.

Pre-Trip Classroom Prep

- Review all materials in the pre-trip prep and read through the student workbook to know what to expect.
- Consider doing a pre-activity and a post activity if it is feasible to increase the amount of learning tied to the experience.
 - **Pre and Post activities**
- Each ***Museum on the Move*** tote has an inventory list and there are set-up instructions on the website.
- Set-up all stations prior to student arrival. There is an intro pull-up banner and banners for each station along with tabletop acrylic stands with instructions. The experience will result in the most amount of learning if the student workbook is used to direct students during the activities. If the Museum on the Move is being used as an exploratory activity rather than a classroom lesson then using the student workbook is not a necessity.

- Determine student groups. There are 6 stations to get through and a minimum of 8 minutes per station is recommended. The instructions are written at a 3rd grade reading level so make sure that each group has at least one strong reader.
- Designate a group recorder for taking notes in the workbook.
- Designate a student in each group to make sure materials are back in their containers at each station before they move to the next one. Emphasize to all students to leave parts at their station and that only the workbook goes with them.
- Determine if students can do all 6 stations within your time constraints. If they can only complete some of the stations then determine a list of stations for each group.
- Review some basic circuit safety with students ahead of time (Do not connect anything to an outlet, make sure hands are dry, disconnect the wires when you are done, etc.)

Before arriving at the museum, introduce these key concepts to your students:

- What is Manufacturing? Explain that manufacturing is the process of making products in large numbers using factories, machines, and smart designs.
- The Engineering Design Process: Remind them that engineers Ask, Plan, Create, Test, and Refine. Emphasize that a "failed test" isn't a mistake—it is just data that tells them how to make the product better.

Station-by-Station Teacher Guide

Station 1: Design a Car (Product Conception)

Students build a vehicle using blocks, wheels, and axles, testing it on a ramp for distance traveled.

- Manufacturing Tie-In: This represents the R&D (Research and Development) phase where a new physical product is born.
- What to Ask/Prompt: "If your car doesn't travel far, can you make any changes to the wheels?" or "How does changing the weight affect its speed?"

Station 2: Circuit Exhibit (Systems Engineering)

Students use batteries, wires, switches, and components to build a complete, closed electrical loop.

- Manufacturing Tie-In: This introduces sub-assembly—making the internal electrical systems that power modern products (like electronics or electric cars).
- What to Ask/Prompt: "Trace the path of the electricity with your finger. Is there a gap in your loop?"

Station 3: Wind Tunnel Exhibit (Aerodynamics & Testing)

Students place shapes or their designed cars into a wind tunnel to observe airflow patterns and resistance.

- Manufacturing Tie-In: This is product testing, ensuring a product can withstand real-world forces before factory production begins.
- What to Ask/Prompt: "Is your object stable in the air, or is wobbly? How can you make the object catch the wind better?"

Station 4: Quality Control (Inspection & Standards)

Students act as inspectors, using a strict checklist to review objects for correct assembly.

- Manufacturing Tie-In: This is QC (Quality Control), the critical factory step that ensures defective products never reach the customer.
- What to Ask/Prompt: "Why is it important that an inspector catches a mistake here instead of a customer finding it later at home?"

Station 5: Tiny Technology (Micro-Manufacturing)

Students use oversized blocks to replicate microscopic patterns.

- **Manufacturing Tie-In:** This simulates advanced electronics manufacturing and robotics, where precision and following precise "blueprints" is mandatory.
- **What to Ask/Prompt:** "Why do you think putting together small parts requires perfect accuracy? What happens to a smartphone if one tiny pathway is out of place?"

Station 6: Refinement Zone (Continuous Improvement)

Students assess poorly performing or "broken" models from a bin and determine if they pass a specific performance test.

- **Manufacturing Tie-In:** This introduces Lean Manufacturing and continuous improvement —constantly fixing inefficiencies to make a product better and cheaper.
- **What to Ask/Prompt:** "What was the single biggest flaw in that design? How did your change fix it?"

Teacher Tips

Give a copy of these bullet points to your adult helpers(if applicable) to keep them engaged as facilitators rather than just monitors:

- **Don't build it for them:** Let students struggle productively. Guide them with questions, not answers.
- **Praise the process, not just success:** If a student's design fails, say: "I love how you noticed that wheel was loose! What's your plan to fix it?"
- **Manage the materials:** Help ensure students leave materials at the station when they rotate so the next group has a complete set of parts.

After the experience

- **Make sure all of the parts from the inventory are in the correct totes.**
- **Follow the tear-down instructions.**