



# ENGINEERS WEEK: IDEAS FOR MUSEUMS

## MARK YOUR CALENDAR FOR ENGINEERS WEEK 2017—FEBRUARY 19 TO 25

Engineers Week offers an enormous opportunity for museums and science centers to integrate the *Dream Big* film into a series of programs and events, special screenings, hands-on activities, design challenge exhibits, and maker/tinker activities. Engage families, students, nontraditional audiences, and local engineers. Showcase how your community “dreams big.”

### 1. ENGAGE ENGINEERS IN YOUR ENGINEERS WEEK PROGRAMS

- Include engineers in your planning for the weeklong event:
  - Use *Dream Big* as a springboard to highlight all of the different types of engineering happening in your community by engaging with a variety of engineering societies or companies.
  - Engineering societies often have local chapters of high school or college students, and/or chapters of young professionals. Reach out to those chapters if they exist in your area.
  - Similarly, some engineering societies have special access to other groups who would enjoy attending your Engineers Week programs: sororities/fraternities, church groups, youth groups, or specific programs such as ASME’s INSPIRE or NSBE Jr.
- **Celebrate engineers during Engineers Week.** Offer discounted tickets for *Dream Big* to engineers or engineering students who show a business card, student ID, or membership card in an engineering organization. Ask groups to promote this perk to their members.

- **Enlist the help of engineers to promote Engineers Week.**
  - Provide your engineer partners an announcement they can send out to their members and contacts to promote the film.
  - Use engineers as sources and spokespeople for your local media outreach.
- **Engage engineers as volunteers.**
  - Ask engineers to facilitate hands-on engineering activities with visitors for a day or a weekend.
  - Include them as experts for a particular demonstration and/or as role models for career-oriented presentations.
  - Invite young engineers like those in the film to speak to visitors.
- **Develop new or expanded engineering programs.**
  - Set up an area in your museum or on social media where people can “Ask an Engineer.”
  - Use engineers as consultants to help you add an engineering component to your existing exhibits.
  - Have engineers guest star at a Science Café (Engineering Café!), or organize a museum speaker series that spotlights engineering careers, achievements, or hot topics in engineering.
  - Show how your community “dreams big.” Volunteer engineers could help host these displays or a community Q&A about local projects in the news.
  - Create a clue-based scavenger hunt where guests must solve an engineering problem with help from engineers along the way.

## 2. CAPITALIZE ON *DREAM BIG* ACTIVITIES SEEN IN THE FILM

- Use the **Earthquake-Proof Structure** activity from the 50 Activities Guide. Design a structure with marshmallows, toothpicks, and a pan full of Jell-O, just like the kids are doing in the film.
- Experiment with the **LIDAR Mapping with Lasers** activity from the 50 Activities Guide. It simulates what the engineer Steve Burrows uses to explore the insides of the Great Wall of China.
- Build the **Windy City Tower** from the 50 Activities Guide and test the power of wind, just like the kids do in the film.
- Use the **Wind Tunnel Design Challenge Exhibit** and see how twisting the building can confuse the wind, just like the Shanghai Tower does in the film.
- Try the **Dream Big Robot Challenge** to perform an “underwater” obstacle course, like the students in the film did in the Underwater Robot Competition.
- Let kids try their hand at building a virtual bridge using the Engineering Encounters software seen in the film.
- Invite Future City teams to showcase their models of what smart cities of the future might look like.

### 3. UTILIZE OTHER DREAM BIG ACTIVITIES FOR EVENTS DURING ENGINEERS WEEK

- Take the **Laser Challenge** and turn music from an iPod into a laser signal.
- Build a **Foil Boat** out of aluminum foil and see how many pennies a boat can hold without sinking.
- Design a **Puff Mobile** and create cars that move via wind power.

### 4. PLAN AN ENGINEERING FESTIVAL DURING ENGINEERS WEEK

For a full description of how to plan and coordinate an Engineering Festival, check out the “Opening Festival” program section on the website.

### 5. INTEGRATE DREAM BIG INTO EXISTING MUSEUM PROGRAMS

- Use *Dream Big* activities on your stages or with your interpreter or explainer programs.
- Host programs on pop-up or table activities.
- Cross-promote the film in the Design Studio and vice versa.
- Promote the film in the exhibits.
- Use one or more of the 4–5 minute *Dream Big* webisodes (easily viewed on the *Dream Big* website or available for free download).
- Find all of the engineering-based exhibitions in the museum and send guests around to collect stamps for their “passport” in a *Dream Big* Scavenger Hunt.
- Consult with an engineer to add an engineering-related component to your exhibits.
- Set up stations throughout the museum that use *Dream Big* activities. Have a volunteer engineer who can demonstrate or answer questions.

## PROGRAM IDEAS FOR ENGINEERS WEEK

The following program ideas are listed alphabetically.

**Career Café:** Introduce middle and high school students to professional engineers in an informal setting, such as the museum café or snack area. Give the students a passport when they arrive. It will tell them where they can go to learn more about an engineering field or area of study, and it gives them a way to track their contacts. Also include information tables for universities and engineering companies. Signs identifying the fields that these engineers represent will help the students decide who they want to visit.

- Include all types of engineers: biomedical, environmental, nuclear, structural, civil, aeronautical, chemical, genetic, forensic, and more!

**DIY (Do It Yourself) Demos:** Museum staff complete a challenge and then provide guests with the space and the materials to try the challenge themselves. Minimal space and materials are required.

- *Examples:* Build a tower out of spaghetti and mini marshmallows. Then challenge guests to create one that is even taller. Challenge your guests to build an Action Figure Diver, a device that has neutral buoyancy. With yours hovering in a tank of water, give guests an action figure to work with until it achieves neutral buoyancy.

**Engineering Challenge Corner:** People enjoy the challenge of designing with a purpose. The Engineering Challenge Corner encourages guests to work as individuals or in small groups to solve a problem or design a better solution.

- Use the *Dream Big* 50 Activities for ideas. From designing a shoe to building a rollercoaster to designing a structure that can withstand an earthquake, there are many fun activities to choose from.

**50 Activities Guide:** Select two or three of the “Design, Build, Create, or Make” activities for each day of your National Engineers Week event and gather the necessary materials. Choose a classroom space that can hold 35–50 people. Create signs so that guests know where to go to participate in the engineering challenge. Run only one activity at a time, meaning that guests should all be building or designing the same thing. You can change the challenge halfway through the day to encourage guests to come back later, or if you find that you are running out of materials, swap out one challenge for another. One suggestion is to stay with an activity if it becomes wildly popular, and swap in another if it doesn’t seem to engage visitors.

- Choose activities that are most relevant to your community.
- Activities can be made more or less challenging, as well as less wasteful, by distributing materials based on a point system:
  - To begin, guests receive 100 points for taking on the challenge.
  - Guests “purchase” materials to use in the challenge by spending their points. For example, if the guests are participating in an egg drop challenge, cotton balls may be worth 3 points each, newspaper may be 5 points for a half sheet, a yard of masking tape might be 12 points, and Styrofoam cups may be worth 20 points. A point system reinforces engineering constraints and encourages groups to plan their design before they walk up and take materials.
  - If groups complete the challenge successfully—in the egg drop challenge, for example, if the egg doesn’t crack or break when dropped—then they are awarded the points that they didn’t spend on materials.
  - The team with the most points at the end of the day could receive a prize, such as free popcorn when they go to see the *Dream Big* film.

**Science Café/Forum Talks:** Some visitors to the Engineers Week events may wish to attend a lecture or forum discussion lead by a local expert in a specific field of engineering. Forum Talks may best serve a collegiate or adult audience, so schedule these in the mid to late afternoons on weekends. Depending on the topic and local interest, you could use small theaters or classrooms.

- *Example:* Invite an environmental engineer to talk about the health of the waterways in your area. Talks of this type encourage conversation between experts in the field and stakeholders living in the community, and opens up problem-solving conversations.

**Giant Jenga:** Build a giant Jenga outside the museum or in the theater lobby. Partner with a radio station or other media to see if you can build the world’s largest Jenga and beat the Guinness World Records record holder.

- As of 2016, Guinness World Records reports the fastest time to build a stable Jenga tower 30 levels high within the rules of the game is 4 minutes, 4 seconds, and the world record for the highest Jenga GIANT tower is 44 levels!

**Local Contributors:** Recognize regional engineers or engineers from history who work to improve lives in your community and/or who have made significant achievements in engineering. Consider the engineering challenges of your area related to hurricanes, earthquakes, water supplies, transportation systems, and so on. Research and highlight how engineering has improved lives in your community and communicate how engineers solve challenges for the benefit of all.

- *Examples:* Create a Wall of Fame for individuals who have made a difference or are working to improve lives in your community. Include historical imagery to show advances in the field.

**Recycled City:** Give your institution a lofty goal of creating a future city with recycled materials. Build it in your lobby or outside the theater to gain maximum attention. Invite Future City competition teams to display their models as inspiration. Have engineering companies or students or others compete. Entry fees could fund a student engineering scholarship or tickets for underserved students to come to your museum and see the *Dream Big* film.

**Structural Scavenger Hunt:** Take a look around your museum building. What do you see? Any arches or domes? Maybe some triangles or squares? Any other shapes or special design features? Engineers Week could be an opportunity for your guests to take notice of the design features in your museum building. Museum staff members will need to walk around the building to determine if guests can easily observe particular features such as a roman arch, pillars, or a dome.

- *Examples:* Provide your guests with a list of structural features that they can easily see in the museum. Have guests use the camera on their phone to take pictures of particular structural features that you want them to observe and post them to your museum's Facebook or Instagram page. You could even encourage them to strike a pose with their favorite design feature in the building, and offer a prize, such as a 25% discount on one item in the museum gift shop or a voucher for up to \$10 off food and beverages in the café.

**Tech Bytes:** Software and computer engineering are exciting fields where technology influences change, but these engineers aren't the only ones to make use of technology. Provide a collective space for these professionals to show their equipment or programs and interact with visitors. Your guests may be as interested to learn about new software that can help middle school students grasp algebraic concepts as they are to learn about advances in knee or hip replacement surgery.

- You may choose to schedule or group the technologies so that structural, mechanical, civil, and aeronautical engineers are in one area or scheduled for one day. Other advances in biomedical, chemical, genetic, and forensic engineering could then be in another place or scheduled for a different time.

**Theatre Shows:** Engineers solve problems. They look at what is going on around them, identify the challenges that exist, and work to find solutions. Staff members at your museum should review the current theater shows to determine which features of the show can be expanded so that the audience will learn more about engineering in a specialized area.

- *Example:* If you have a theater show that makes use of liquid nitrogen, staff members could talk about how biomedical engineers use liquid nitrogen.

**Trivial Trifles:** Every city and region has structures that represent feats of engineering. Determine which structural features from your area stand out most and create 10 to 50 trivia questions about these structures for guests (the number depends on your use). Trivia questions can be placed at different locations throughout the museum so that students or families need to find all of them and try to answer them. Or create a trivia competition with a small group of individuals and ask multiple-choice questions of each.

- Use stamps or stickers as a reward for students or families playing the trivia game at the museum. As prizes for winners of the trivia competition, use vouchers for free drinks or popcorn when they watch the *Dream Big* film.

