Rules
The Tech Challenge 2018: Drop & Dash

Important Note Regarding the Rules
Clarifications and additions to the rules may be made due to lessons learned at test trials. When changes occur, registered Tech Challenge teams will be alerted by email. Changes will be noted in the rules on The Tech Challenge website in red type. Teams are encouraged to monitor the website for changes. The website also includes answers to frequently asked questions (FAQs) which are added and updated periodically.

Spirit of the Challenge
The Tech Challenge emphasizes the importance of developing engineering solutions that would be practical in real life, otherwise known as the Spirit of the Challenge. Judges will be looking for compliance with this idea and will ask teams questions like, “How would your design work in real life?” They will also look to a team’s engineering journal for evidence of real-world application of the team’s solution.

Store-bought solutions are not in the Spirit of the Challenge. Teams are encouraged to design and build devices using their own ideas and creativity. Use of existing plans for reference and inspiration is allowed. All plans, and the source of those plans, must be documented in the engineering journal.

The Challenge
Design and build a device that can survive a drop and deliver supplies. No batteries allowed!

Two attempts are allowed to achieve the challenge. Each attempt is made up of two parts.
Part One: Drop device from 10 feet and land in the drop zone.
Part Two: Once landed, the device must deliver a payload of one U.S. penny onto a target located on a ramp.

Story Contest (Optional)
Where is your device? How did it get there? What is it dropping and why? What happened to the batteries? Tell us your story!

Email your story to challenge@thetech.org. The deadline is Friday, April 13, at 11:59 p.m. Story length must be no more than one page. Include team number and grade level, and put a copy of the story in your engineering journal.
Device Specifications

1. Only one device per team is allowed.
2. No batteries (electrical storage devices) may be used.
3. Device may be composed of multiple parts that must be dropped together.
4. Device must include a 2 +/- 3/16" diameter lifting ring that cannot collapse under the device weight. (See Figure 1.) The lifting ring will attach to a drop tower provided by The Tech.
   a. The lifting ring must fit in a slot that is 3/16" wide.
   b. Lifting ring must be mounted at the very top of the device, and at least an inch of the lifting ring above the device must be exposed to allow connection to the drop mechanism.
   c. Lifting ring mounting direction: perpendicular to course direction. (See Figure 2.)

Figure 1. Lifting Ring Dimensions

Figure 2. Lifting Ring Orientation
5. Maximum device size envelope including the lifting ring: 24" x 24" x 24" while hanging. (See Figure 3.) The device must remain inside the size envelope until dropped.

6. Maximum device weight: 3 pounds.

7. Payload: One unmodified U.S. penny
   - Penny must be plainly visible when the device stops without disassembly of device.

8. No sharp edges are allowed.

9. Each team must have their own device. Teams may not share their device or any portion of their device with other teams.

10. All devices must be clearly marked with the team number.

Remember, store-bought solutions are not in the Spirit of the Challenge. Teams are encouraged to design and build devices using their own ideas. Use of existing plans for reference and inspiration is allowed. All plans, and the source of those plans, must be documented in the engineering journal.

**Test Rig Specifications**

1. Test rig consists of a tower with a drop mechanism, drop zone and target area. (See Figure 4.)
   - The top of the device will be raised to a height of 10 feet.
   - Note course direction as shown in the figure.

2. Your device will be attached to a drop mechanism and dropped from a height of 10 feet. The lifting ring will be perpendicular to the course direction.

3. The 2 foot diameter drop zone is directly below the drop mechanism as shown in Figure 4.
4. Course consists of a:
   a. 2 foot diameter drop zone.
   b. 8 x 4 foot target area (ramp) beginning 3 feet from the center of the drop zone.
   c. Safety area: 6 feet x 8 feet.

5. The height of the end of the ramp:
   a. 6 inches (Grades 4-8)
   b. 12 inches (Grades 9-12)

6. Bands on the ramp will be clearly marked, indicating the target.
7. There are two 3½ inch curbs leading to the ramp. (See Figure 6.)
8. The ramp has $3\frac{1}{2}$ inch high curbs along the sides. There is no curb at the end of the ramp.

**Setup and Performance**

1. After being greeted by the judges, participants will have four minutes for setup and performance. This period starts at the direction of the judges.
2. The team will place their device on a cart provided by The Tech for setup, then attach their device, using the lifting ring, to the drop mechanism.
3. Participants must move to the identified safety area and remain there until after device stops moving. (See Figure 5.)
4. While the device is raised into position by The Tech Challenge staff, additional staff will move the cart out of the way.
5. The team’s safety officer will release the device.
6. After release of the device, no further touching or controlling of the device by the team is allowed during that attempt.
7. A successful landing of the device is achieved if the payload (penny) lands within the drop zone.
8. Once landing is achieved, the payload (penny) must be delivered to the target area on the ramp. This may be achieved by moving the entire device or any portion of the device.
9. Payload delivery success is determined by the final resting place of the payload (even if it moves backwards) in the bands on the ramp of the target area.
   a. The goal is to deliver the payload to the **green** band.
b. The final resting place of the payload (penny) determines the level of success.

10. Once a judge determines the final resting place of the payload, one of the judges will announce that the team may set up their second attempt.

11. The team will collect their device, repeat setup and drop within the four-minute performance period. No additional time will be allowed.

12. Scoring will be determined as follows:
   a. Grades 4-8: Best of two attempts
   b. Grades 9-12: Sum of two attempts

13. Teams may not damage The Tech Challenge rig. Teams damaging the rig will not have achieved the challenge.

Safety

Safety is the top priority during all phases of The Tech Challenge.

1. Teams will be judged on safe design and implementation.

2. Judges have full authority to stop any activity they view as unsafe. The judges’ word is final.

3. Each team will identify a team safety officer who will ensure safety from design through implementation.

4. Teams must provide their own ANSI-approved eye protection (i.e. glasses, goggles, masks) and wear eye protection at all times when in designated areas around test rigs or when constructing/testing their device.
   a. Teams will not be allowed to participate at test trials or the showcase unless all members have the required eye protection.
   b. Regular eyeglasses do not provide the necessary level of eye protection and are not an acceptable substitute for ANSI-approved eye protection.

5. Teams must provide and wear their own head protection consisting of hard hats, bump caps or athletic helmets.

6. No animals.

7. Teams may not use flammable liquids or gases.

8. Teams may not use pressurized gases greater than 5 psi. Teams using pressurized gas must be able to demonstrate to judges by using a gauge that the pressure does not exceed 5 psi.


10. The use of AC power is not permitted at test trials or the showcase.

11. Closed-toe shoes are highly recommended.

12. Teams must be able to transport their device safely without the assistance of others, including parents, advisers, siblings, friends, etc. The use of carts, wagons or other transport devices is encouraged since a great deal of device movement is required and judging times may be lengthy.
13. Team members must remain on the ground at all times. They may not sit, stand, climb on or go under rigs, or be lifted by other team members during setup and performance periods. No ladders, step stools or other lifting equipment allowed.

**Engineering Journal**

1. How teams develop their solution is as important as the solution itself. The engineering journal is a record of this process and is included in judging of team success. The journal must be an organized and detailed notebook or binder.

2. At the showcase, each team must submit one engineering journal.

3. The engineering journal should be started at the beginning of the team’s involvement in the program. Organized records should be kept of all team activities. The team’s journal is a living document. More information on engineering journal requirements can be found on The Tech Challenge website. Go to [Team Guide](#) then click Engineering Journal.

4. Display boards (like those used for science fairs) and digital presentations are not a substitute for an engineering journal. However, these may be a useful part of a team’s presentation to the judges.

5. Journals may be typed or handwritten. Legibility and organization are important.

**Adviser**

1. Teams must have an adult adviser. Team solutions must be designed, built and tested by team members, not the adviser.

2. The adviser role is to guide, facilitate and mentor.

3. The adviser may not be a Tech Challenge judge.

4. An adviser may work with more than one team. However, it is important that advisers ensure each team receives the necessary level of attention.

5. Click here for the [Adviser Guide](#).

Now that you’ve read this far, **here’s the last request: write the name of an engineer who inspires you** at the bottom of the last page of your engineering journal.