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# Vocabulary

Terms and definitions.

**Adviser:** A person at least 18 years old who monitors safety, acts as a mentor and who may provide things like transportation and snacks. Your team should only have one adviser, and he or she shouldn't give you all the answers or do the project for you.

**Aerodynamics:** A branch of fluid mechanics concerned with the motion of air and other gasses and their interaction with solid objects such as an airplane wing.

**Air Currents:** Air moving due to differences in pressure or temperature.

**Anemometer:** An instrument for measuring and indicating the force or speed and sometimes direction of the wind.

**Brainstorming:** Coming up with ideas — sometimes crazy ones — for a solution to a problem. It's possible to brainstorm on your own, but most find it works best as a team activity.

**Chemical reaction:** A process in which one or more substances are changed into others. Chemical reactions are not allowed in this year's challenge.

**Compressed air:** Air held under pressure in a container: the force generated when the air is released is used to operate machines, tools, etc. For the Tech Challenge, we limit the amount of pressure allowed from compressed air to 5 psi (pounds per square inch).

**Constraints:** A control or limit to a design. For example, a constraint might be that your device can't weigh more than 3 pounds.

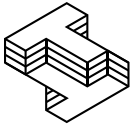
**Design:** The creation of a plan for the construction of your device. Sometimes used to refer to the device itself.

**Device:** The gizmo you and your team are designing, engineering and building for The Tech Challenge.

**Dimension:** A dimension is a measurement such as length, width, or height. If you talk about the dimensions of an object or place, you are referring to its size and proportions.

**Dynamic Pressure:** Pressure of air that is in motion.

**Engineer:** A person who designs, constructs and tests devices, materials and systems while considering constraints caused by safety, practicality, rules and cost.



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**Engineering analysis:** Looking at a problem using scientific analytic principles and processes so you can see the properties of what you are designing. To start, break down a problem into its basic parts to look at relationships between its pieces and things other than your device.

**Engineering journal:** A record of all the brainstorming, research, prototyping and other work that goes into developing your team's device.

**Failure:** Sometimes you feel this when your device doesn't work, but a big part of engineering is finding failure points and fixing them. So running into a roadblock with your device is an opportunity to use your engineering brain to make your device even better.

**Failure point:** When a break in a system causes a device to work improperly or not work at all. One of the jobs of an engineer is to find failure points so they can fix them, and it's one of the reasons we test again and again.

**Final design:** The final plan for the construction of your device, agreed upon by the whole team. The team develops the final plan after brainstorming, prototyping and testing again and again. Sometimes this term is used instead of Final Device.

**Final device:** The device your team will bring to the showcase — the product of all your team's brainstorming, designing, prototyping, testing and re-testing.

**Fluid:** A liquid or gas that conforms to a shape surrounding it, like water in a glass. Surprise! Air is a fluid.

**Friction:** When one object rubs against another, it creates friction. What happens when you and another person try to go through a door at the same time? You probably bump up against each other, causing friction, which makes it difficult for either of you to get through the door.

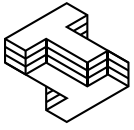
**Headwind:** A wind blowing from directly in front, opposing forward motion.

**Innovator:** Someone who creates something new or makes changes to something that already exists in order to meet a specific need. For example, you and your team as you design, engineer and build a device to survive a drop and travel some distance without using batteries.

**Iteration:** The different versions of the device you build as it changes due to the Engineering Design Process.

**Living document:** A document that is continually being updated. For example, your engineering journal.

**Momentum:** A measurement of mass in motion. Any object in motion has momentum.



**Nominal:** Approximate; that is, there may be minor variances between the measurements stated in the rules and drawings and the actual test rig, for example

**Perseverance:** Not giving up in the face of failure. Your team may experience setbacks, but it doesn't have to give up. Getting past those failures can be fun and rewarding.

**Pit:** The area where, during the showcase in April, you and your team will make your final preparations before judging.

**Prototype:** A first full-scale and usually functional form of a new type or design of a construction.

**Repeatability:** The ability of your device to demonstrate the same results under the same conditions, i.e. to work every time you test it.

**Resistance:** The ability to withstand the force or effect of that force.

**Safety:** Your No. 1 priority! Safety involves using tools correctly, wearing your hardhat and goggles when working on and testing your device, and more. While your team should appoint a safety monitor, everyone on the team is responsible for safety!

**Solution:** The design your team builds for The Tech Challenge.

**Specifications:** Detailed descriptions of design criteria for a piece of work.

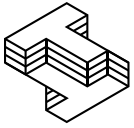
**Spirit of the Challenge:** The Tech Challenge emphasizes the importance of engineering solutions that would be practical in real life. Test rigs involve small-scale representations of real-world conditions. Teams should develop designs that represent real-life solutions.

The Spirit of the Challenge is an important factor in scoring. The best engineering journals document an understanding of real-world factors and contain a detailed explanation of how your design might have practical, real-life applications. Teams should expect judges to press them on this issue and will be asked questions such as "How would your design work in real life?" A good explanation of how their design approach is compatible with the Spirit of the Challenge will have a positive influence on the team's score.

While store-bought solutions are not prohibited, they are not in the Spirit of the Challenge.

**Tailwind:** A wind blowing in the direction of travel of a vehicle or aircraft; a wind blowing from behind.

**Test rig:** The thing your team will test its device on. The Tech Challenge designs an official test rig. We also design a simple version you can build so you can test at home or school.





# The Tech Challenge

Presented by Amazon

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**Tether:** A rope, cord, etc. fastened to something to control movement. In the 2023 challenge, tethers are not allowed from the device to the rig platform.

**Velocity:** Quickness of motion. Rapidity of movement.

**Weight:** The amount that a thing weighs. This year's Tech Challenge has a weight limit.

**Weight limit:** Rule establishing the maximum weight of an object, person, or device.

**Wind load:** The force on a structure arising from the impact of wind on it.

**Wind speed:** Wind speed is the speed of the weather-related air movement from one place to the next.

**Sources:** Collins Dictionary, Wikipedia, <http://www.engineering-dictionary.org>, Vocabulary.com, Merriam-Webster.com, and American Heritage dictionary