

Adviser Guide

Welcome to The Tech Challenge! This guide is for team advisers, educators and parents of participants in The Tech Challenge. Thank you for supporting the young innovators who are the heart of this special program.

Please read this guide, as well as the accompanying [Team Guide](#). They contain guidelines, resources and ideas that will help you and your students get the most out of this program.

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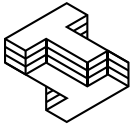
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? 1. The Basics

I want to be an adviser and a judge. Is this allowed?

No. A person may not serve as adviser and judge in the same year.

How many students may be on a team?

A team can have two to six students.

Can we have more than six people on our team?

No. If you have more than six students, split your group into two teams.

Can my student participate in The Tech Challenge alone? My student doesn't want to work as part of a team, or can't find anyone with whom to team up.

The Tech Challenge is a team activity. Each team must have at least two students.

Can you help my student find a teammate?

The Tech Challenge does not organize teams. We recommend asking friends, classmates, or students from after-school activities to join your team.

How old does one have to be to participate in The Tech Challenge?

Students must be in 4th grade or higher. This is not an appropriate activity for students who are not in at least 4th grade.

I have a 4th grader who wants to work with his or her sibling or friend who's in a higher grade. Can they be on the same team?

Yes, a team may have students from different grades. It will compete in the division based on the highest grade on the team. For example, if a team has both a 4th grader and a high school student, then it will participate in the Grades 9-12 division.

Does each team need an adviser? My student is very responsible.

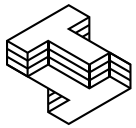
Each team needs an adviser. Advisers must be at least 18 years old, understand safety rules and help teams stay on track. Advisers can be any responsible adult including teachers, parents and scout leaders.

I'm an educator with a class/program of 36 students. How do I manage 6+ teams?

An adult may be an adviser to more than one team, but it is important that the adviser is not spread too thin so each team gets the attention it deserves. Consider recruiting some help.

Do I need technical or engineering skills to be an adviser?

No. Many teams intentionally seek an adviser who will *not* offer technical assistance. If you do have technical expertise, show restraint when sharing it. Remember that this is a challenge for the students.



How do I register my team?

Click [here](#) to register.

How much does it cost to register?

Early bird registration is \$50 per team (not per student), with two to six students on each team. Starting December 1, registration will be \$75 per team. The fee is waived if your team is from a Title I school or recognized after-school program. Email challenge@thetech.org if you have questions.

How do I know if my team is registered?

You'll receive a confirmation email containing a link to add information such as team and student names. Save this confirmation email. It has your team number, an important thing to know!

How many events do we have to attend?

For advisers, please attend the info clinic and adviser training in-person OR review the info clinic and adviser training mini-courses available online. Team members should also attend the info clinic or review the info clinic mini-course. We recommend teams and advisers attend at least one test trial. And, of course, we hope to see you at the showcase in May! Please see our [website](#) for more details.

How do I find out about these events?

Check out participant events [here](#).

After the team is registered, how do we get started?

Advisers and parents should read the [Team Guide](#) so they are aware of the expectations, guidelines and resources for student participants. Also, see section 4, "Getting Started," below.



2. Safety

You are the adult in the room, and you know the capabilities of the students, so take the lead where safety is concerned — especially when using tools. Let them do what they can, but step in if you feel your students can't do something safely.

You can learn more about team safety by attending or reviewing adviser training and info clinic.

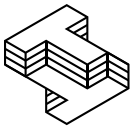


3. The Adviser's Role

How involved in the project should I be?

Here are some tips:

- Do not direct. Mentor and guide the team. The project should be designed, built and tested by the students.



- Facilitate conversations to help the team consider the challenge from different perspectives.
- Help the team solve problems by asking open-ended questions. Do not provide answers or solutions.
- “I don’t know” or “I’m not sure” followed by “let’s find out” are useful phrases.
- When providing assistance with tools, be sure to follow the team’s exact directions even when it may be flawed (as long as it’s safe).
- Be supportive. Encourage. Be patient.
- Keep your hands off the device, except to ensure safety.

Your role as adviser can range from chauffeur to chef, from referee to manager. The most important job is to be encouraging and help the team solve the challenge themselves.

What are some questions I should be asking myself as work progresses?

- Are the students doing the actual work?
- Are the design ideas generated by the team?
- Are you advising and mentoring, or problem solving?
- Are your questions steering the team toward solutions, or are you asking open-ended questions that allow the team to come up with their own?

What if more than one parent wants to be an adviser?

They may be well meaning, but the more adults advising a team the greater the chance they will take over the project.

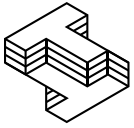
Here are helpful roles other adults who want to be involved can play:

- Provide transportation if needed.
- Organize and host team meetings.
- Prepare lunch/snacks for team meetings.
- Donate items to be used in prototyping/building and provide tools.
- Assist with team costumes.

It’s a good idea to hold a parent meeting at the beginning of the project so that everyone understands the scope of the challenge, puts key dates on their calendars, and has a common understanding of each person’s role.

Will I be with my team during the showcase?

No. You’ll check the team in and be the only adult to accompany them into the pit, where they’ll prep their device and wait to be called for judging. When the team goes to judging, you’ll go to the stands as an observer. **Please don’t stand in the aisle to watch your team go through the interview.** Trust that your team is ready. Your team should be able to handle everything themselves.



4. Getting Started

I'm not sure how to get the team started. Do you have suggestions?

Many students have never taken on a project like The Tech Challenge. Help them see the big picture by creating a project schedule. Break down the work into stages.

Here's a sample schedule:

First

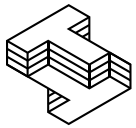
- **Get organized.** Schedule team meetings. Not all meetings will be productive, but you can help team members stay on track by getting them to set some ground rules such as:
 - We will attend all team meetings.
 - We will focus on the project during team meetings.
 - We will put every team member's skills to use.
 - We will be open to ideas from all team members.
 - Most of all, we'll have fun!
- **Start thinking.** Help the team research the challenge and its constraints. Have everyone read the rules. Encourage the team to break the challenge into smaller parts. Remind them to look at the world around them for ways this problem can be approached.
- **[Register](#) for The Tech Challenge.**
- **Come to an info clinic with your team** OR have everyone review the info clinic mini course. You can ask questions in-person or send questions to challenge@thetech.org.

Then

- **Make a plan.** Help the team create a timeline with goals and milestones.
- **Brainstorm.** There are many brainstorming techniques. See section 2 of the [Team Guide](#) for suggestions.
- **Take notes.** The plan, all brainstorming ideas, research on those ideas, questions and learning from clinics and test trials should be recorded in the engineering journal. This is part of the story of their Tech Challenge journey and a reference for the team.
- **Dig deeper with research and development.** Have the team pick three or four favorite ideas from the brainstorm list to research and develop with sketches, words and quick prototype models.
- **Attend [participant events](#)** such as info clinics, adviser trainings and test trials. Please see our [website](#) for details.

Next

- **Choose a design.** After the team has prototyped and tested several ideas, have them select one design to work on.



- **Document results.** Remind the team to take notes at every meeting and spend time analyzing what does and does not work well. Test results should be added to the engineering journal.
- **Review judging criteria.** Judging criteria and constraints can be found in section 5 of the [Team Guide](#).
- **Attend [test trials](#).**

Finally

- **Test and redesign.** Go through a final stage of testing and troubleshooting.
- **Prepare documentation.** Encourage the team to organize their notes and review their process as they go along. This is better than trying to do it all at the end. Remind them of the judging criteria and help them find relevant examples.
- **Get creative.** Encourage the team members to express their creativity at the showcase with costumes.
- **Prepare for the finish line.** Have the team get ready for the showcase by making finishing touches to their device(s), organizing the team's journal (make sure to gather all information into one well-organized document) and practicing the team interview.
- **Celebrate early and often!** There are plenty of milestones if you break things up in steps. Celebrating can be as simple as getting excited about a small part of the prototype working.



5. Resources and Support

What sort of additional support can my team seek out?

There are many ways schools, organizations, teachers and parents can support your team:

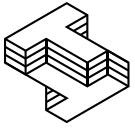
- Seek help from teachers (examples: science, shop or woodworking, drafting, art) or volunteers at a school or community organization. Expand your search outside the school, organization or teachers you know.
- Contact managers at hardware or thrift stores about sponsorships. Ask them to provide materials in exchange for mentioning their business on team costumes or the actual device.



6. Managing Your Team

When is the best time to meet?

Popular meeting times are before or after school and on weekends. Some teams meet during school when doing The Tech Challenge as a class or club project. Find a time that works for everyone and stick to it. Meetings should be held safely and follow directions from county and state health departments.



How should our team meetings be organized?

Each meeting should have an agenda and goals. Keep track of time and make sure there is room in the schedule for cleanup. Keep in mind that most students can work on an activity like this for about two hours before their productivity drops. Snack time can help break up longer meetings.

Keeping an engineering journal will be a challenge for our team. Any suggestions?

To make journaling seem less difficult and help get the team's thoughts organized, ask these questions at the beginning of each meeting:

"What are we going to do today? What do we want to accomplish?"

At the end of the meeting, teams should answer:

"What did we learn today? What do we need to do at the next meeting?"

These answers can be in words, photographs or sketches. This is the beginning of a great engineering journal! Be sure to add detail and information to drawings and sketches such as dimensions and construction notes.

Have the team work on the journal as they go along. At this stage, a journal doesn't have to be a professional-looking, "finished" document. It's important just to take notes.

If your team is still stuck, check out additional questions you can ask them in the [appendix](#).

Teamwork is an issue with my group. Any suggestions?

Students sometimes need a little nudging to get out of the "all about me" phase. When communication breaks down, give them hints about how to talk to each other:

Common phrasing

We should...

My idea is...

I think...

We need to...

More productive phrasing

What if we tried...

Remember when you came up with the idea that...

What do you think we should try next?

Have we looked at all of your options?

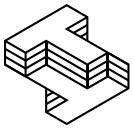
If you are advising a mixed-gender team, keep an eye on who takes on which roles. Each team member should have experience in all stages of the project. Make sure all students have an equal chance to learn new skills.

It seems like one or a couple of team members are running the show. What should I do?

Some students may take over the project, leaving others' voices unheard. Some will disengage on their own, while others are pushed out. Don't let this happen. Say things like, "Have you taken a vote on this?"

We've been working on this for a while, and the team is losing focus. What should I do?

Students may lose motivation mid-way through the project, particularly if they are feeling stuck.



Help guide them around this problem by having them look elsewhere for inspiration such as books, toys, other teams, games or TV shows, or back at their original brainstorming in their engineering journal.

7. Budget, Materials and Design

How much should we spend on our solution?

The Tech Challenge offers no guidelines or constraints. Help the team establish a budget. Key considerations are:

- Materials costs for building the device.
- Documentation costs (notebook, paper, etc.)
- Spirit costs (costume and presentation). Spirit-themed items such as T-shirts, a team logo, team name and colors can be inexpensive and add creativity, fun and motivation.

Many common items are useful for prototyping and building a device. Things for the team to take apart including electronic toys and other discarded items can help students learn valuable things about mechanics, motors and more.

- **Find used items.** In addition to items found in your recycling bin, visit garage sales, flea markets and thrift shops to find gadgets, tools, junk, used toys and other items to take apart and salvage.
- **Go shopping.** Check out hardware, hobby and craft stores. Stores that specialize in particular materials such as plastics or foam can be great sources. Also, consider online stores that can help with parts for the device or team spirit supplies.

How do we start prototyping?

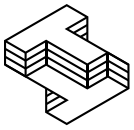
Some tips:

- Have the team mock up their top ideas using cardboard or other easily found materials.
- After getting design ideas from those mockups, encourage the team to build a functional prototype (not necessarily made of the final materials).
- Team should test prototypes multiple times and adjust or rebuild as necessary. Don't forget to document the prototyping and testing processes in their engineering journal.

How important is testing?

Very important! Test early and often. Attend as many test trials as possible. The team will gain valuable experience and be able to get feedback from our judges.

Make test trials a team meeting. Have the team record in their engineering journal what happened during the test.



Be sure to test team prototypes as many times as possible and not just at test trials.

It's important to make sure the team doesn't get discouraged by failure. Remind them how much they're learning about what *doesn't* work, and encourage them to persevere. Failure is part of the design process.



8. Showcase

What should we expect at the [showcase](#)?

At the showcase, teams will be judged in three phases:

- **Interview**
- **Engineering Journal**
- **Device performance.**

Advisers do not accompany teams through the judging process.

What is involved in the interview process?

Teams of judges will interview the team. During interviews, team members should be prepared to:

- Discuss their roles, process and experiences working on the challenge, including how they dealt with failure.
- Point out elements of their documentation that highlight their process and experience.
- Explain their innovations in design and/or use of materials.
- Explain the real-life applicability of their designs.
- Show off their creativity, inventiveness and style using costumes, songs, marketing materials, and/or cheers.

Teams should prepare by practicing with their adviser. Prepared presentations are welcome, but are not required, and should last less than two minutes.

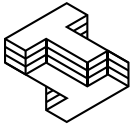
How does device performance work?

The team will demonstrate their device on a test rig for judges to evaluate. Power outlets will not be available.

What else do we need to know?

The [showcase](#) can be hectic, so make sure everyone knows what they're supposed to do. Have the team practice. Some guidelines:

- Make sure all the parents know well in advance the date and time of the showcase.
- Have the team make a list of everything they need for judging.
- The team should practice demonstrating their device multiple times, including setup, operation and cleanup.



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- The team should practice its group presentation in front of parents or other supportive adults.
 - Teams need support and encouragement from you and their families. Keep the focus on the fun of participating in The Tech Challenge, not the stress of competing to win an award. Celebrate the team's accomplishments regardless of the day's outcome.
 - Have fun!



9. 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.

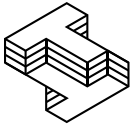
The Spirit of the Challenge is an important factor in scoring. The best engineering journals document an understanding of real-world factors. Teams should expect judges to ask questions such as "How can the ideas you've used for your solution be applied in real life?"

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



10. Common Core Standards

Want to know more about how the Tech Challenge aligns with Common Core engineering design standards? Look at our [educator's resource page](#).



Appendix

If your team is stuck on how to journal, here are some suggested questions to ask that might help them document:

- How is your team organized? Is it working? What changes have you made?
- How will your team solve the challenge?
- Research
 - Where has your team found information on their ideas?
 - What are your sources and what have you learned from them?
 - What is your team focusing on to create a successful solution or device?
- Brainstorming
 - What ideas has the team come up with? How were they shared with the team and talked about?
 - How did you evaluate your ideas? How did you decide which ideas to prototype and which to set aside? Did the team have a system to help with the decision?
- Prototypes
 - How did the team develop your device(s)? Are there drawings or sketches with dimensions, construction notes and materials? Who worked on the device(s)?
 - If you built or considered more than one prototype, did you document them?
- Safety!
 - How did you and your teammates help each other to work safely as you built and tested your prototypes?
- Testing
 - How well did your testing work?
 - How did you keep track of testing?
 - Was testing done more than once?
 - What did the team learn from the test results?
 - Are any calculations included in the engineering journal?
 - Have you included pictures of the testing process?
- Failure
 - Did any of your device(s) fail?
 - What did you do to figure out the cause of failure?
 - Did the failure inspire your team to modify your device(s) and re-test?
- Final Solution
 - What was the end result and your final solution?
 - Did it meet the rules?
 - Are there pictures or drawings of the final device?
- Reflections
- What did you learn?
- What will you remember about this year's challenge?
- Does your challenge solution have a real-world application?
- Is it practical and useful?
- Spirit of the Challenge
 - Does your team feel like they have met the Tech Challenge successfully and learned more about engineering and the world around us? Has your team observed an increase in their critical thinking skills?