The Tech Challenge | Kenya

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Team Guide

Welcome to The Tech Challenge Kenya! You and your friends are joining a rich legacy of young innovators who take on real-world challenges— with hard work, resourcefulness and a lot of fun. Please read this entire guide.

Table of Contents

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1. Getting Started

This is our first time doing The Tech Challenge. How do we get started?

1. **Form a team:**	Your team can have two to six people. You can have students from different grades on your team, but you will participate in the division of the oldest grade on your team. Grades 4-6 Grade 7-9 Grades 10-Form 4
2. **Find an adviser:**	Advisers must be at least 18 years old. • Their job is to monitor safety rules and help your team stay on track. • An adviser doesn't have to be an engineer. • They can be teachers, parents, or any other responsible adult. • Make sure your adviser reads the **Adviser Guide** on the website.
3. **Register:**	Your adviser needs to **register** your team for The Tech Challenge on the website thetech.org/kenya
4. **Make a calendar:**	Mark down important dates, including the **Showcase** and Test Trials. **What are Test Trials?** • They are a chance for your team to test what you have built on the official rigs and get feedback from judges. **What is the Showcase?** • The showcase is a final presentation for your team. You will share your Team Journal, do a Team Interview with judges, and demonstrate and test the device you built. Have your adviser learn more and sign up for all the participant events on our website.

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We have a team and an adviser, and we've registered. What now?

- Read the **Rules** on the website. They will help you understand the challenge. Updates will be emailed to your adviser.

What exactly does an adviser do?

- Your adviser should guide your team but should not do the project for you.
- Ask your adviser for help finding answers, getting supplies, and using tools.
- It's OK to respectfully ask your adviser to step aside, but always make sure they are there when you use tools or test your device.

How many times do we need to meet?

- This is up to your team.
- A key to success: make a calendar and meet regularly.
- Make a list of things you want to get done at each meeting.

What are the judges looking for?

- A team commitment to safety.
- Examples of teamwork and how each person on the team contributed to the project.
- That the team considered multiple designs and can explain how they decided which one to build.
- That the team tested the device during every stage of development.
- Stories and examples of how the team overcame failure.

Spirit of the Challenge

The Tech admires every student who tackles The Tech Challenge. We value your creative thinking and encourage teams to pursue surprising solutions that are better than anything we might imagine.

Remember that this is a challenge, not a competition. Teams work to beat the challenge, not other teams. Work together and keep trying when the going gets tough. Failures are a normal part of the process. We look forward to teams telling us about their journey, even the times when the team felt like quitting. Their journal, interview, and device demonstration do not need to be perfect to be amazing!

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2. How to Be a Team of Innovators

Do you have any advice about working as part of a team?

- **Learn to work together.**
  Listen to each other. Team members may have different skills and strengths. Use this to your advantage.

- **Be curious.**
  Try out new materials, ask questions about what your teammates are thinking, or investigate new ideas together. Curiosity can lead to fun discoveries and connections you didn't expect.

- **Learn from your mistakes.**
  The first device you build may not work. Innovators create, test, and improve, over and over and over. Learn from failure and persevere to find the best solution.

- **Start your Team Journal early.**
  Take notes every time you meet! Keep track of ideas and designs, testing results, and team decisions. Rotate who writes in the journal to reflect the different perspectives of the team members.

- **Practice Patience.**
  The design process doesn't always go in order. Sometimes you have to move back to a step you've done before, like brainstorming, to help improve your design.

- **Persevere.**
  You'll run into roadblocks. Don't give up!

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3. Design Process

You talk a lot about the engineering design process. What is that?
There are many ways to describe the engineering design process*.

How might we use this design process?

*Engineers don't always follow these steps in order. You might design something, test it, find a problem, and go back to an earlier step to modify your design.

This is called iteration, and it's likely that in your process you will iterate many times.

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Talk about the challenge and the problem.

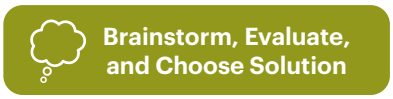
- How have similar problems been solved in the past?
- What do you know about the science and engineering behind the challenge?
- How would it work in the real world?

Discuss criteria and constraints. These are the goals and limits for your device. What will you have to do to be successful?

- For example, what does it need to do? How much can it weigh?

Make a plan and a budget. We're not just talking about money here. We're also talking about budgeting time.

- How much time do you have to brainstorm?
- How much work do you need to do to be ready for the showcase?



What's brainstorming?

Brainstorming is a way of solving problems by coming up with ideas off the top of your head.

Tips for Brainstorming:

- Pick a team member to write down ideas and keep them in your journal.
- Be sure to include everybody's ideas. Don't throw any ideas away. Who knows? They may be useful to you later.
- Evaluate: Review the ideas at the end of your brainstorming sessions, before you forget any details. As a team, pick which ideas you want to work on first.
- Brainstorming doesn't just happen at the beginning of the design process.
  - Run into problems mid-way through your project? Use your brainstorming skills to figure out a solution.

Find more tips and resources for brainstorming on the website, including: Brainstorming Strategies, Brainstorming Tech Tip, Brainstorming Ideas Lesson.

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Once you have an idea, build some prototypes and test it out.

How do we decide what to build?
That's up to you, but in addition to the coolness factor you should consider things like:

- How long will the project take?
- Would it work in real life?

How often should we test?

- Test at every stage of development.
- For example, build a rapid prototype. Then test it. Did your prototype do what you expected it to do?
  - Refine your prototype. Test it again. Did it work better or worse than it did the first time?
  - Make more changes.
- **Test early and often.**

Remember to write the results of all your testing in your journal and describe how each of your tests helped you make your device better.

- Be ready to show how your device evolved from brainstorming to final design.

You also talk a lot about failure. Isn't failure a bad thing?

- Every great engineering project comes with plenty of failure ... or rather, plenty of opportunities to improve your design. How else will you know what doesn't work? You can use that information to make your solution better.

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4. Team Journal

Who should write our team journal?

- **The Team! ALL team members should help.** The contents should reflect the ideas, thoughts, inspiration, and creativity of all team members, even if only one person is taking notes.

What should be in our team journal?

- Take a look at the Design Process graphic. Each step of the process should be documented in your Team Journal. Use it as a guide. (**See the next page** for some ideas on this!)

Where should we write our team journal?

- Write your Team Journal in a place that is easy for your team to update. This could be a notebook, binder, or digital format like a Google Doc. Remember, you will need to turn your journal in online as a PDF.
- You may also write your Team Journal in a notebook that your adviser will provide to you.

When should we write our team journal?

- Right from the beginning, document your team's ideas and activities. Keep writing, sketching and sharing throughout your project. Don't leave it until the end. You might forget the best parts!

What is the secret to creating a great journal?

- We want to hear how you worked through challenges and solved problems.
  - What did you discover?
  - What was hard and how did you work through it?
  - What types of problems did you have?
  - How did you fix them?
  - How did you work together?

We want examples that are specific to your project.

- The best journals will tell the judges what you learned and how that helped you improve your design or how it might help you in the future.
- **Great journals also show exactly how to build your final solution.**

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More on documenting the design process in your journal ...
Here are some suggestions about things to include along the way.

Define the Problem

- ☐ Brainstorming and planning meeting notes
- ☐ Notes about the real-world problem

Do Background Research

- ☐ Research sources
- ☐ Notes on what you learned about engineering in the real world
- ☐ Important facts and connections

Specify Requirements

- ☐ Team decisions on the requirements for your solutions/devices
- ☐ Safety considerations

Brainstorm, Evaluate and Choose Solution

- ☐ Brainstorming notes and diagrams
- ☐ Sketches
- ☐ Testing and results
- ☐ How did you decide which ideas to move forward? (Make sure you document that!)

Develop and Prototype

- ☐ Drawings, pictures, and diagrams with measurements
- ☐ Materials
- ☐ Construction notes
- ☐ Flaws or improvements made
- ☐ Information on all your prototypes

Test

- ☐ Methods (How you tested and what you learned)
- ☐ Results (How did you decide which ideas to move forward?)
- ☐ Test more than once!

Does Solution Meet Requirements?

- ☐ Notes on how your solution/device met your requirements
- ☐ Anything you used to help you decide

Share Your Solution

Organize all your notes

- ☐ Sketches, pictures, and diagrams
- ☐ Reflections on the process and what you learned

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Common Questions about Journals

Do we have to take meeting minutes?

- No, but for many teams this is the easiest way to record your progress. Other methods may include a timeline, schedule, or dated notes on brainstorming, prototyping, testing, and changes to devices.

Is a Table of Contents required?

- No, but it needs to be organized so it makes sense to readers (Judges) who have never seen it before.

What sections are required?

- There are no specific section requirements. Teams are welcome to organize their journal to reflect how their team solved the Tech Challenge.

Is it okay for each team member to write a journal?

- Only one Team Journal will be accepted per team. All team members may take notes, make drawings and sketches, take pictures, record test data, and write reflections on what they have learned. But these must all be compiled and organized into ONE Team Journal.

How long does the journal have to be?

- There are no length or word count requirements.

Are there examples of excellent journals we can look at?

- Each team is unique and chooses to solve The Tech Challenge based on their own thinking, creativity, and ingenuity. Your journal should reflect this uniqueness. Using an example from another team's journal might limit your own creativity, so we do not offer examples.

Tip: Don't forget to bring your journal to the Showcase!

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5. Showcase

How do we get ready for the showcase?

- Make sure you've completed your solution, talked about what everyone is supposed to do, and prepared your journal in ways that demonstrate your spirit, ingenuity, and teamwork!

On the day of the Showcase, Judges will consider three categories:

Team **Journal**	Team **Interview**	Device **Demonstration**
Your team will bring your journal to the Showcase to turn it in. • Don't forget to make it clear which design is your final solution.	Judges will talk with your team about how you arrived at a solution. • Your team journal and ability to discuss your process are just as important as your device.	Your team will demonstrate your solution. • You will test your device on the test rig. • Judges will evaluate how well your design meets the challenge.

Sample Interview Questions
Practice talking about your device and your process.

- Tell me about:
  - your brainstorming.
  - the source of your ideas.
  - how you worked as a team.
  - how you tested your solution.
- What idea did you choose as your solution? Why?
- How does your design work?
- What did you choose to document in your journal? Why?
- How did each of you contribute?
- How did you build your solution?
- Tell me about your failures.
- What did you learn from this process?

And most of all, remember to have confidence in yourselves!
Keep in mind the Spirit of the Challenge, and be ready to tell us about your journey,

More Questions?

See website for more student resources:
thetech.org/kenya