The Tech Challenge

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.

WhatsApp No: +254 713 247170
Email: ttckenya@thetech.org
Website: thetech.org/kenya

WhatsApp No: +254 713 247170
Email: ttckenya@thetech.org
Website: thetech.org/kenya

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 in the same Division. ● i.e. a 4th grader and a 6th grader can be in the same team but in the 4th-6th Grade Division.
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. ● They will also need to attend the **adviser training** and **info sessions**.
3	Register	Your adviser should **register** your team for The Tech Challenge on the website. www.thetech.org/kenya
4	Make a calendar.	Mark down **important dates**, including the **showcase**, as well as the info sessions and adviser sessions. **What's an info session?** ● It's a chance for you, your team, adviser, and family members to learn about the challenge. ● The sessions will be held online - Learn more about the info and adviser sessions and sign up on our website.

We have a team and an adviser, and we've registered. What now?
● Read the **Rules** on the website. This 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 he or she is present when you use tools or test your device.

WhatsApp No: +254 713 247170
Email: ttckenya@thetech.org
Website: thetech.org/kenya

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 were considered, 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.

WhatsApp No: +254 713 247170
Email: ttckenya@thetech.org
Website: thetech.org/kenya

2. Engineering Design Process

You talk a lot about the engineering design process. What is that?

There are many ways to describe the engineering 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 do the same.

WhatsApp No: +254 713 247170
Email: ttckenya@thetech.org
Website: thetech.org/kenya

The Tech Challenge

How might we use this engineering design process?

Define the Problem   **Do Background Research**   **Specify Requirements**

- 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 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?

Brainstorm, Evaluate and Choose Solution

What's brainstorming?

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

Tips for Brainstorming:

Dive in! Be bold.

Defer judgment.

Build on each other's ideas. "Yes, and..."

Keep it short, but go for quantity.

Have fun!

- 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 engineering design process.
  - Run into problems mid-way through your project? Use your new 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.

WhatsApp No: +254 713 247170
Email: ttckenya@thetech.org
Website: thetech.org/kenya

Develop and Prototype	Test	Does Solution Meet Requirements?

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. 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.

WhatsApp No: +254 713 247170
Email: ttckenya@thetech.org
Website: thetech.org/kenya

3. Engineering Journal

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

Where should we write our engineering journal?
- Write your engineering journal in a notebook that your adviser will provide to you.

When should we write our engineering 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?
- Don't roll your eyes, but 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.

WhatsApp No: +254 713 247170
Email: ttckenya@thetech.org
Website: thetech.org/kenya

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

- **Define the Problem**
  - Brainstorming and planning meeting notes
  - Diagrams

- **Do Background Research**
  - Research sources
  - Notes on what you learned
  - Conclusions and connections

- **Specify Requirements**
  - Team decisions on the requirements for your solutions/devices

- **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

- **Test**
  - Methods
  - 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
  - Diagrams
  - Scoresheets

WhatsApp No: +254 713 247170
Email: ttckenya@thetech.org
Website: thetech.org/kenya

❓ 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 engineering 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 engineering 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.

🌍 4. 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. Judges may ask questions like, "How would your design work in real life?"

They will also look at a team's engineering journal to see if they have an understanding of real-world factors or notes on how their solution could be used in real-life.

WhatsApp No: +254 713 247170
Email: ttckenya@thetech.org
Website: thetech.org/kenya

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!
- Practice talking about your device and your process.
- Be confident. Judges want to see what makes you a strong, creative team.

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

The Engineering **Journal**	The Engineering Process **Interview**	The Device **Performance**
Your team will turn in your journal. ● Don't forget to make it clear which design is your final solution. ● Your team won't be around to answer questions during this part of the judging.	Judges will talk with your team about how you arrived at a solution. ● Your engineering 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.

WhatsApp No: +254 713 247170
Email: ttckenya@thetech.org
Website: thetech.org/kenya

6. How to be a Strong Team

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

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

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

- **Start your engineering journal early.** Take notes at the info session and every meeting. Keep them in your journal, then figure out what works well and what needs improvement.

- **Be patient.** The engineering design process doesn't always go in order. Sometimes you 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!

💡 More questions?

See website for more information: https://www.thetech.org/kenya

---