

DESIGNATHON: PARTICIPANTS GUIDE

WHAT IS IN THIS GUIDE?

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- How do I get involved with Engineers Without Borders UK?

Welcome to an Engineers Without Borders UK Designathon! By participating today, you are joining hundreds of students from Chapters across the country who will be taking part in the same challenge.

This challenge is extremely unique in its multidisciplinary approach; intended for not only for engineering students but for those from a variety of disciplines including business, design, architecture, sociology and anthropology. The more diverse perspectives you have to develop your solution, the better!

Partaking in an Engineers Without Borders UK Designathon provides you with an introduction and awareness of globally responsible engineering; ensuring you are designing for people, improving livelihoods and reducing our impact on the planet. You are joining our community of thousands of engineers who are working to make sure engineering serves all people and the planet better than ever before.

This Designathon is your opportunity to:

- Develop your engineering skills using a real-world design brief.
- Learn how design decisions can impact people both locally and globally.
- Develop skills in communication, planning and project management.
- Develop skills by working with people from a range of different disciplines.

DESIGN PROCESS

Engineers are known for solving problems. This Designathon is about defining the problems the community faces whilst understanding their needs, before considering a solution.

The Designathon provides you with real world context through the design brief and supporting materials. It will challenge you to propose engineering inventions that could make a difference. As a result, there are no predetermined correct answers and there are likely to be multiple possible solutions. Just as in a real project, you will need to work out an appropriate solution and justify why you think this is the case.

To help get you started we've put some advice together based on our experiences working on projects like these.

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Step One: Analyse the context

- To get off to a good start, you will need to take time to gather information and build your understanding before you start proposing design ideas.
- For example, you will not be able to propose an appropriate way to improve electricity access without first understanding what people use electricity for, how important it is to them, how often they use it, how much they use, what potential generation resources are available, or how any of this might change in the future.
- Within the Designathon this refers to all the factors, internal and external, that influence how people live their lives. Whilst people everywhere share many of the same needs, how people live is also affected by factors such as geography, politics, culture and the environment, all of which differ from place to place.

Step Two: Define the problem

- After analysing the context, you should be able to identify the problem that you are going to address.
- Whatever issue or issues you choose to work on, you will need to justify why you think they are important.
- It is very important that you consider the economic, social and environmental impacts of your design. You can do this by working to the criteria below:
 - o **Economic criteria** may include a need to consider realistic capital, operational and end of life costs, you might also consider economic opportunities or risks.
 - o **Social criteria** may include positive or negative impacts on the local community, consideration of cultural norms, local capacity to implement and maintain the proposed idea, and, whether or not any proposed idea requires significant lifestyle changes that may make it hard to implement.
 - o **Environmental criteria** may include consideration for any resource or materials choices and their associated environmental impact, pollution that may result from the proposed idea and whether this can be dealt with, and positive or negative impacts on local flora and fauna.

Step Three: Explore lots of options

- From your analysis of the context, your definition of the problem and identification of the design criteria, you can start to explore how engineering and your design's ability to make a difference.
- When you've got lots of ideas, critically assess them against your design criteria to help you focus on the idea that you will pursue, develop and recommend.
- Judgement is a key skill for engineers and as a professional you will be expected to use it to come to sensible, justifiable decisions for which you can be held responsible. Now is a great time to start developing this skill.

Step Four: Justify your recommendation

- As a professional, you will be expected to be able to explain your idea, and why it is the right solution, to a range of audiences.
- Clear communication is vital here! Consider the use of images, diagrams, videos and models as well as the written and spoken word to get your idea across.

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- Outlining the process you have gone through should assure people that you have taken logical steps to reach your proposed design and that you are confident it is appropriate.

Things to consider including:

- o Capital costs/ Operational costs
- o Business model- considering who is going to pay for your design.
- o What materials and skills are required and where these are expected to come from
- o How the idea will be made / manufactured / constructed
- o What maintenance and repair is expected?
- o What training or education might be needed, for operation or use?
- o How will local people be involved in the process?

TOP TIP!

It is important to consider your business plan when completing this challenge. Find our easy step by step [business plan](#) to help you gain a better understanding of all aspects of your design.

DESIGN BRIEF

The location for this challenge is Kibera, considered to be one of Kenya's largest informal urban settlements located in Nairobi, the country's capital city. The settlement has a long history beginning during the early 1900s when Kenya was a British colony. Kibera has evolved as a neighbourhood not formally recognised by the authorities in Nairobi. As a result, the development of key infrastructure has been challenging and the people living in Kibera suffer from the impacts of poor water and sanitation provision, a lack of waste management, limited transport and digital infrastructure and unsafe energy provision. With the population of Nairobi set to rapidly expand in the coming decades it is vital that these issues are addressed.

Despite these economic, social and environmental challenges, Kibera also has many assets: entrepreneurship, a strong social fabric, and extensive community activism. The community is attempting to deal with the issues in this place so many call home.

Today it is a vibrant, bustling, densely packed neighbourhood delivering an important, affordable settlement niche within Nairobi. Its population is estimated to be anywhere between 250,000 - 500,000 people.

Your design brief for the Engineers Without Borders UK Designthon is to develop engineering solutions to improve lives, livelihoods or to enhance the natural environment within Kibera.

JUDGING PROCESS

To win, teams must successfully demonstrate appreciation of globally responsible engineering. This includes demonstrating analysis of the social, environmental and economic factors, clearly outlining how this understanding has identified the issue you wish to address and is embedded into your design criteria, evidencing their engineering/design decision making and then justifying why your proposed engineering intervention is appropriate.

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All teams exhibit their designs using a poster or any other materials/prototypes they may have developed during the Designathon. The teams will present a short elevator pitch followed by questioning from judges.

OUR FIVE TOP TIPS FOR PRESENTING YOUR DESIGNS

- Practice, Practice, Practice – No need for explanation here, the better preparation the better the presentation. The more you practice the more confident you will feel.
- Play to your strengths – You are a part of a team. All of you will have different strengths and each team will have different dynamics. Think about who is going to present and what you are going to present. Will everyone speak or just one or two of you? Think about what will work best for the group and make the most of each others skills and weaknesses.
- Know your audience – How you should present depends on your audience, think about who they are and what they want to know. Think about what they are likely to know and what they are not. Use your time wisely to convey the most important and relevant elements of your design. Tailor your pitch to your audience.
- Know your design – This might seem obvious but it is essential. Take the time to really understand every aspect of your design: How much does it cost? What makes it unique? What are the bad points and what could be improved? The more you understand your design the better you will be both presenting on it and answering questions about it.
- Smile and relax – This is easier said than done, pitches are stressful for everyone, but evidence suggests that your body actions can influence your emotions. So when you smile (even if you don't really feel like it), you can trigger your brain to relax and when you are more relaxed your pitch will be more natural.

MARKING CRITERIA

This criteria will be used when judging your designs. It is important to become familiar with this criteria to ensure you are including the fundamentals which will ensure your solution is appropriate for this challenge.

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Marking Criteria	Mark Allocation					
	1	2	3	4	5	
Globally responsible engineering						
a	Demonstrate inclusion of the social/community context	No consideration	Some reference but little/no connection to the design	Description of context and some connections made to design	Good description of context and relevant connections made to design throughout the design process	Detailed description of context. Excellent connections made to design throughout the design process
b	Demonstrate inclusion of the environmental context	No consideration	Some reference but little/no connection to the design	Description of context and some connections made to design	Good description of context and relevant connections made to design throughout the design process	Detailed description of context. Excellent connections made to design throughout the design process
c	Demonstrate inclusion of the economic context	No consideration	Some reference but little/no connection to the design	Description of context and some connections made to design	Good description of context and relevant connections made to design throughout the design process	Detailed description of context. Excellent connections made to design throughout the design process

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Communication, collaboration and team working. Teamworking is critical to the success of any project and being able to communicate your solution is fundamental. Collaboration with other teams at your Designathon is actively encouraged as demonstrated within the Marking Criteria.

2		1	2	3	4	5
a	Communication	No justification for idea and concept	Limited description of the idea and justification.	Satisfactory description of the idea, clear justifications and communication of concept	Good description of the idea, clear justifications and communication of concept.	Excellent description of the idea, clear justifications and communication of concept.
b	Collaboration	No collaboration	Limited collaboration proposed	Reasonable collaboration with other teams + teamwork demonstrated by group	Good collaboration with other teams + teamwork demonstrated by group	Excellent collaboration with other teams + teamwork demonstrated by group

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WHO IS ENGINEERS WITHOUT BORDERS UK?

Engineers Without Borders UK is a charity that engages and galvanises the engineering community to serve all people and our planet better than ever before. We do this by working across multiple levels of education, industry professionals and leaders. Our involvement in universities varies from running modules that highlight globally responsible engineering to working with individuals who run Chapters, spreading the message of Engineers Without Borders UK up and down the country, engaging students and the wider community in our message.

Are you a member of your EWB university Chapter? [Find out here](#) if your university has a Chapter. If not [find out how to begin one here](#).

[Learn more about the challenges](#) we run in our universities, and ask your academics if they are running these courses in your institution this year!

This document has been produced by Engineers Without Borders UK. November 2019.

The design brief has been created in partnership with Kounkuey Design Initiative (KDI). To learn more or support the ongoing efforts of KDI, please visit their site. Disclaimer: KDI is a third-party organisation and Engineers Without Borders is not responsible for ensuring content on this site.

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