SECONDARY LEVEL

WATER FOR EVERYONE EVERYWHERE

PRINTOUTS

Water for Everyone Everywhere is a hands-on enquiry-based workshop that enables pupils to explore the global issues associated with water access and the role that engineering plays in water distribution.

UK ENGINEERS WITHOUT BORDERS

This document has been produced by Engineers Without Borders UK.

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This document and the accompanying materials are available to download from: www.ewb-uk.org/water-for-everyone-everywhere.

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OVERVIEW

Water for Everyone Everywhere is a workshop designed to encourage pupils to explore the challenges associated with access to safe and clean drinking water around the world. Pupils learn about the importance of water to people's everyday lives and the role that engineering infrastructure plays in the distribution of water. Pupils design, build and test their own model water filter as part of this workshop. This workshop builds on the Sustainable Development Goals and the concept of global citizenship.

This document contains the printouts for Engineers Without Borders Ambassadors delivering the workshop. Teachers and youth group leaders can also use it. It should be used in conjunction with the accompanying slides, slide notes and Facilitator's pack. Please note that this resource is periodically updated. The date of the last update is on the inside front cover.

If you are not a teacher/youth group leader, please sign up to become an Engineers Without Borders Ambassador to be able to deliver this resource. Find out more and register here on our website. For any queries, please contact Engineers Without Borders UK directly using the email address: outreach@ewb-uk.org.

CONTENTS

TABLE OF PRINTOUTS

FOR CASE STUDY ACTIVITY: CARD SORT	
Water for Everyone Everywhere Case Study Activity	Print out 1 set of cards per group and cut up cards.
FOR BUILD ACTIVITY: MAKE A WATER FILTER	
Water for Everyone Everywhere Build Activity Printouts 'BUILDING A WATER FILTER'	Print out 1 worksheet per group or per person (double sided)
FOR OPTIONALACTIVITY: WATER ACCESS ISSUES	
Water for Everyone Everywhere Optional Activity Printouts	Print out 1 set of sheets

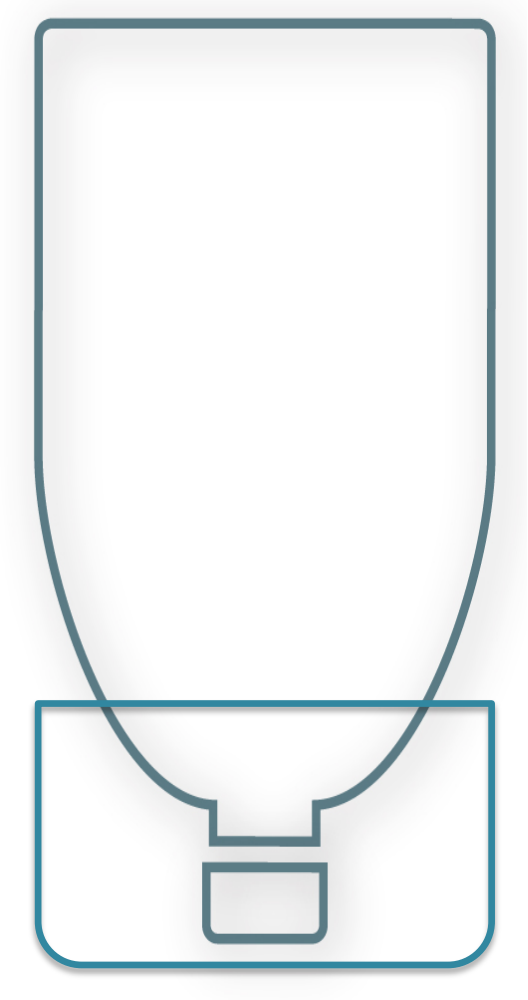
CASE STUDY ACTIVITY

LOCATION	ISSUE	SOLUTION
London, UK, Europe	Due to the high and increasing population in London, water shortage is a problem. Not many people are aware, and water is wasted or lost. As the population approaches 9 million, it is important that water is conserved.	A group at London Metropolitan University has worked hard to reduce water usage, saving £2,350 and increasing awareness. Rachel, the Energy Manager at a University, worked with her students to reduce the university's water use by 1,183 cubic metres.
LOCATION	**ISSUE**	**SOLUTION**
Mexico City, Mexico, North America	The nearby lakes have been contaminated with sewage. Residents have to buy expensive containers filled with water from outside the city. Water is piped into the containers from far away. This gives the 21 million people in the city inconsistent access to water that they used to get reliably from the five lakes.	Residents have installed rainwater harvesting systems to capture rain falling on their rooves. This is a cheaper, temporary solution while the residents wait for the government to improve the sewage system.
LOCATION	**ISSUE**	**SOLUTION**
Bambui, Cameroon, Africa	The mountain spring streams have been contaminated with cow manure. The source of the spring is hard to access on foot. The water is plentiful, safe and clean at the source, but it is far uphill through dense vegetation. Cow farming is increasing, so people continue to get ill from the contaminated water.	Bambui Water Authority was set up by the community to build a water distribution system which accesses the spring at its source. The water comes through pipes from the source to the village. This means the village can get the water they need more easily.

BUILDING A WATER FILTER

Create an annotated sketch of your water filter. Plan the order you will put your filtration materials into the cut-off plastic bottle. Follow the design checklist.

Design Checklist:	✓
Rank the dirtiness of the water at the bottom of the sheet	
Think about how the materials can be used to filter water	
Decide on your design as a team	
Drawn the filter layers and label the material	



Remember to think about the direction the contaminated water will flow through the filter and what size physical contaminants you want to filter out first.

1. Rank the dirtiness of the water before passing through the filter:

   Very clean 1 2 3 4 5 6 7 8 9 10 Very dirty

2. Rank the dirtiness of the water after passing through the filter:

   Very clean 1 2 3 4 5 6 7 8 9 10 Very dirty

3. Describe how you would improve your water filter.

OPTIONAL ACTIVITY: WATER ACCESS ISSUES

SCENARIO 1

You are a population living high up a mountain and are not connected to a water source. Materials are expensive to install and pipes and technical know-how is scarce.

1. What are the impacts of not having access to water for your population?
2. What factors do you think have led to a lack of access to water?
3. What would an engineer need to consider and find out more about to address this issue?

SCENARIO 2

You are a population that had access to water but due to a problem in the water distribution system you are no longer connected. Other populations downstream of the system are also affected.

1. What are the impacts of lacking access to water for your population?
2. What factors do you think have led to a lack of access to water?
3. What would an engineer need to consider and find out more about to address this issue?

SCENARIO 3

Your population is rapidly increasing due to large numbers of people moving to urban areas and having families. Materials to install pipes are expensive and technical knowledge is a limited resource.

1. What are the impacts of lacking access to water for your population?
2. What factors do you think have led to a lack of access to water?
3. What would an engineer need to consider and find out more about to address this issue?

SCENARIO 4

You are a population that relies on a rain water harvesting system. There has been a significant reduction in water supply this year. Materials and skills needed to build new infrastructure.

1. What are the impacts of lacking access to water for your population?
2. What factors do you think have led to a lack of access to water?
3. What would an engineer need to consider and find out more about to address this issue?

SCENARIO 5

Sewage is entering the ground water supply that your population relies on. Other populations downstream of the system are also affected.

1. What are the impacts of lacking access to water for your population?
2. What factors do you think have led to a lack of access to water?
3. What would an engineer need to consider and find out more about to address this issue?