



TeachEngineering

Raise the Roof! Engineering a Leakproof Roof



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Question: Why do you think pollution is a big problem in countries with fewer resources and less money?

How do we combat and reduce waste and pollution?



Think About It

Look at the following photos of pollution in Ghana...

What do you notice? What do you wonder?



Think About It

Why do you think Ghanaians cannot just build recycling centers like wealthier countries in the world do?



Think

Are there ways to repurpose recyclable materials without having a factory?



Collection



Repurposing



Artwork



Artwork



Artwork



Can we solve the problem of excess
recyclable waste while also solving
another problem?

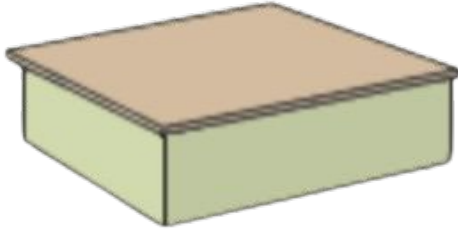
Here is the second problem: dry homes/shelters



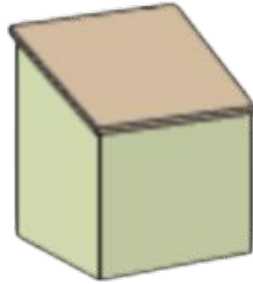
Problem 2: Dry Homes/Shelters



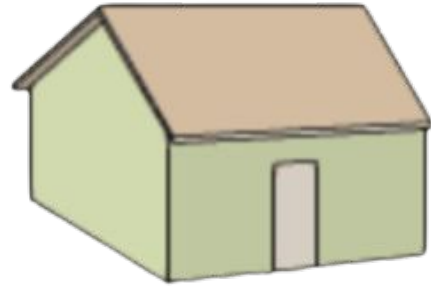
Challenge: Raise the Roof



flat



lean-to



gable

- In an effort to help solve the country of Ghana's recycling challenge and help residents to have dry roofs, you are going to create a simulation of a roof for a basic housing structure in order to design and build a more sustainable and leakproof roof.
- Once the roofs are built, water will be poured on them and left for five minutes.

Criteria:

- The housing structure must be a flat, lean-to, or gable provided by your teacher.
- The roof:
 - Must cover the entire housing structure.
 - Must be made of resources available to the country of Ghana and recycled materials.
- The shape of the roof will determine the housing structure shape.
- The more recycled materials added, the better the score.

Constraints:

The roof:

- Must not hold water.
- Must not have any leaks.
- Must be made with only the materials provided.

Points	1 pt	2 pts	3 pts	4 pts
How well does the water run off the roof?	Water pours through the roof into the structure below.	Water pools on top of the roof.	Some water runs off the roof and some water pools on roof.	All water runs off the roof.
How much of the roof utilized the resources (glue and tape)?	Used only non-recycled resources.	Used a significant amount of glue or tape.	Only used a small amount of glue and tape to construct roof.	Used minimal glue or tape.
How much of the roof is made of recycled materials?	25% or less.	More than 25%, less than 50%.	More than 50%, less than 75%.	More than 75%.
How well does the roof hold its shape after 5 minutes?	Roof entirely collapses.	Roof partially collapses.	Roof stays intact but bows.	Roof stays intact, remains unchanged.