

# Prototyping a solution to air pollution

This prototyping activity is designed to get participants to use their creative thinking muscles and to think outside the box when coming up with ideas.

Prototypes don't have to work; they can even be a smaller or larger scale model, and be made using any material. They're used as a tool to communicate ideas that can then lead to further refinement.

## Materials

- Paper
- Cardboard
- Straws
- String
- Aluminium foil
- Paddle pop sticks
- Tape
- Paperclips or wire
- Scissors

## Steps

1. Pick and read one of the four air pollution problem cards.
2. On a piece of paper, write down or draw as many different ways of solving this problem as you can. This is just the first part of the challenge, so don't spend too much time doing this!
  - a. For a challenge, you can set yourself a time limit of 5 minutes.
3. Look at your ideas, and pick your favourite.
  - a. If you do not have a favourite, combine your favourite features into one. It may help to write down or draw your new idea!
4. Using the materials provided, start building your prototype!
  - a. For a more difficult challenge, limit the amount of materials you are allowed to use as this will replicate the limited resources available to real innovators.
5. Once you have finished your prototype, repeat the steps again with another air pollution card

## Extension

If you would like to keep improving on your prototype, you can use other materials to keep refining. This could even include making a working model and including electronics and other technology.

## Air Pollution Problem Cards

On average, there are 67 million car trips taken a day in the UK! These car trips give off lots of air pollution that is harmful to humans and traps hot air in our atmosphere.

Are you able to think of a way to capture the air pollution from cars and dispose of it safely?



Trees absorb and store carbon dioxide and create oxygen! Around the world, trees are being cut down for buildings and cities like London and Luton.

Without removing buildings, can you think of a way to keep trees and plants in our cities?



To generate electricity, we burn fossil fuels, creating air pollution. We breathe this air pollution in, which is harmful to us.

What other sources of renewable energy can be used to produce electricity?

Where could you put these electricity generating machines?



Humans eat a lot of meat and drink a lot of milk. The cattle used for meat and milk fart and burp a lot! Their farts and burps are made up of a gas called methane which contributes to the greenhouse effect.

How would you capture and get rid of the methane?



# Measuring Air Pollution

Do you know what is in the air you are breathing in? In this experiment, you will be able to see the particles in the air!

## Materials

- A sheet of card (or something similar like a paper plate)
- Petroleum jelly (Vaseline)
- Scissors
- Butter knife
- Marker
- String or tape
- Pencil
- Magnifying glass

## Steps

1. Before you begin making your air pollution collectors, choose where you want to test for air pollution. This can be inside and outside your house.
  - a. The air pollution collectors will need to stay in the same location for 4 days so make sure you find a safe location. If it rains during your experiment, you may need to stop the experiment and start again so check the weather forecast beforehand!

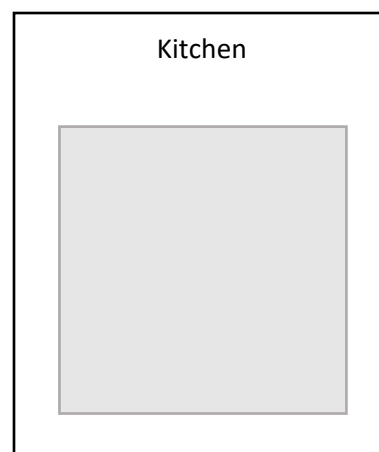


Figure 1. Example of air pollution collector

2. Using a pair of scissors, cut the card into rectangles approximately 10cm by 12cm. The number of squares you cut will depend on how many places you want to test.
3. Once you have cut your rectangles, use a marker to label each with the locations.  
If you are placing these outside where members of the public can see, you may want to write "This is a science experiment. Please do not touch."
4. Using a butter knife, carefully spread a thin layer of petroleum jelly on the card. Please see Figure 1 for an example.
5. Once you have made your desired number of collectors, take them to each location and using string or tape, securely stick or hang them.
6. You have now set up your air pollution collectors! Wait 4 days for particles to settle on the collector.
7. After the 4 days, carefully take down your collectors without touching the petroleum jelly.
8. Inspect each of the collectors with the magnifying glass.
9. When looking at your experiment, think about the following:
  - a. Which one has more air pollution? Why?
  - b. What do the particles look like? Do they look similar to other locations? Why?
  - c. Where do you think these particles have come from?
  - d. Would the results change if you chose different locations?

## Extension

You may want to repeat the experiment in different locations and compare how much air pollution is in those locations.

You can also repeat the experiment in the same locations to see if you get similar results.