



HOME SERVE

By Princee, Shivali, Crysanthia and Sahana



Home Serve:

- Established in 1993
- Provides for domestic emergencies
- British Gas – top competitor
- Global PLC

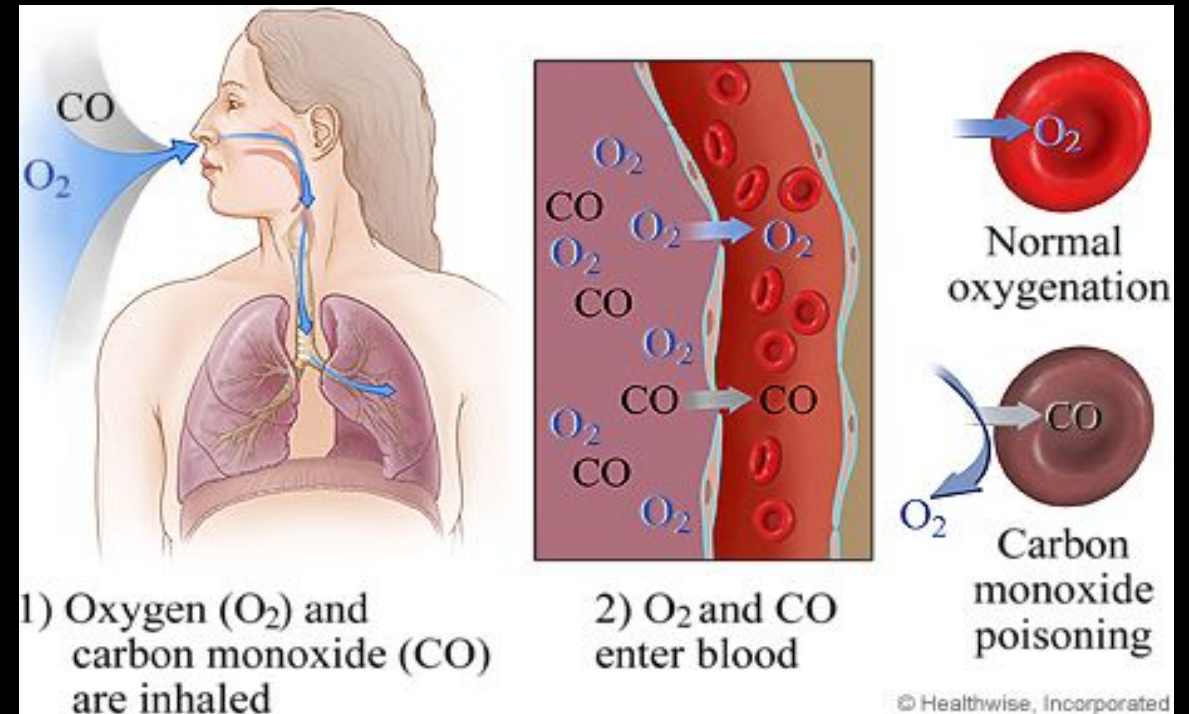
What does a PLC mean?

- Well known company
- Shareholders
- Financial opportunities
- Ownership

What is Carbon Monoxide?

- A by-product of combustion reactions
- Acts as a competitive inhibitor of haemoglobin

“Carbon monoxide is a poisonous gas that has no smell or taste. Breathing it in can make you unwell, and it can kill if you’re exposed to high levels”

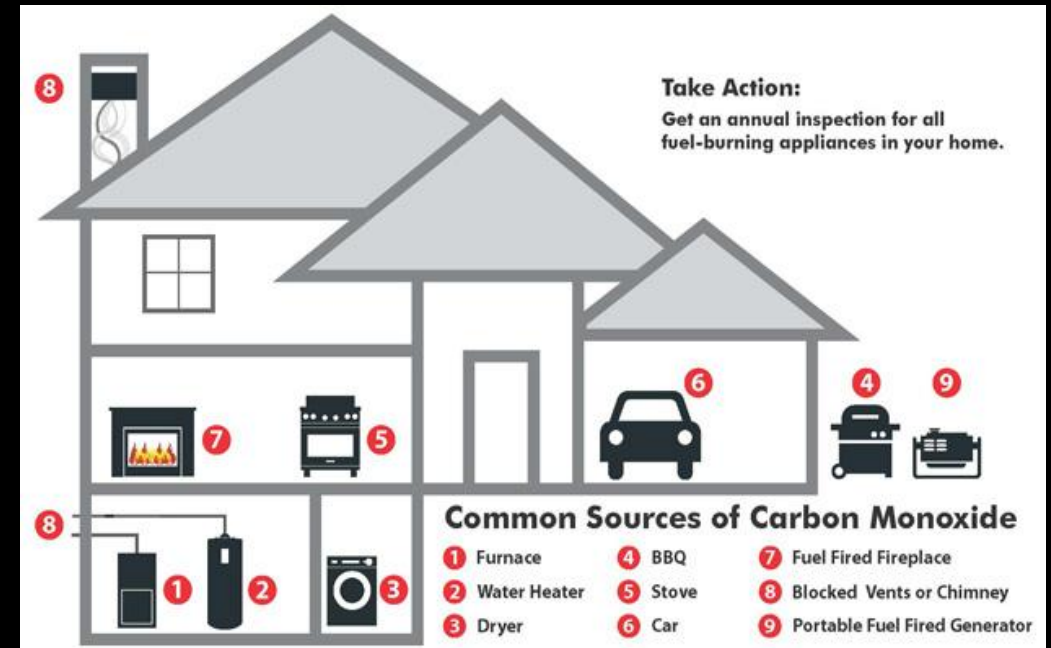


“Every year there are around 25 deaths from accidental carbon monoxide poisoning in England and Wales”

What are the symptoms of CO poisoning?

Symptoms:

- Headaches
- Dizziness
- Weakness
- upset stomach
- Vomiting
- chest pain
- confusion



How does a CO detector Work?

Carbon monoxide detectors sound an alarm when they sense a certain amount of carbon monoxide in the air over time.

Different types of alarms are triggered by different types of sensors:

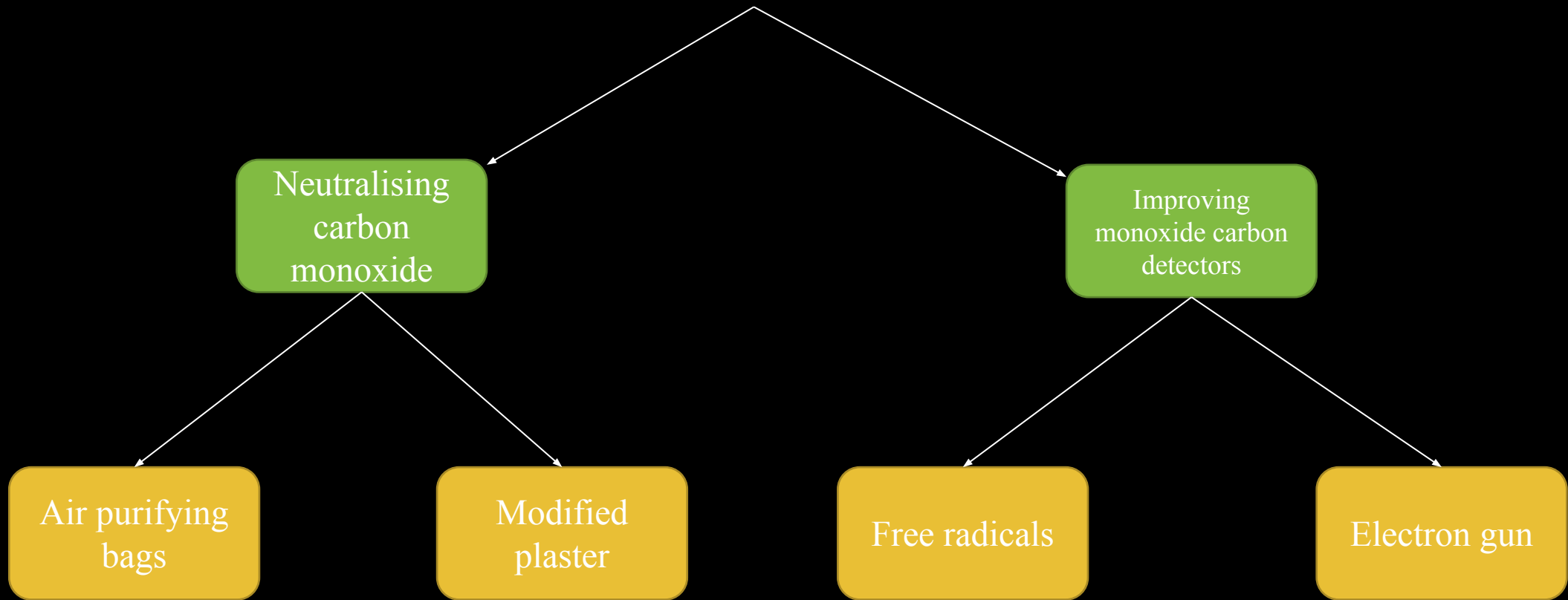
- **Biomimetic sensor**
- **Metal oxide semiconductor**
- **Electrochemical sensor**

Where should I place a carbon monoxide detector?

- Outside the doors of sleeping areas
- On each floor of your home
- Anywhere else required by local laws

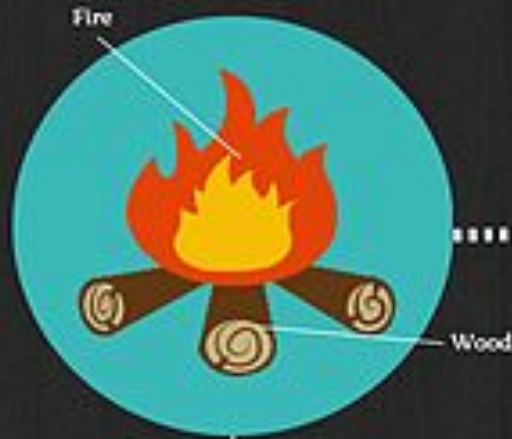


Our ideas

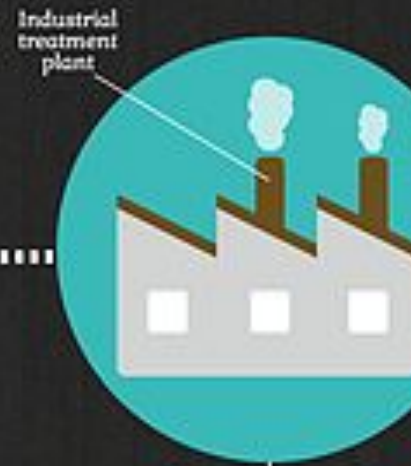




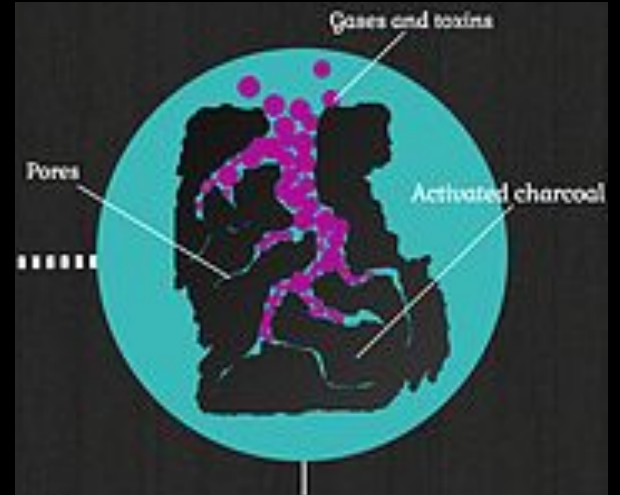
AIM – FIND WAYS TO
NEUTRALISE CARBON
MONOXIDE



Activated charcoal begins as regular charcoal-- the black charred coals left behind when you put a fire out.



The charcoal is then "activated" at high temperatures with oxidizing gases or with more efficient chemicals. These processes erode the charcoal's internal surfaces to create a ridiculously high surface area (over 5382 square feet).



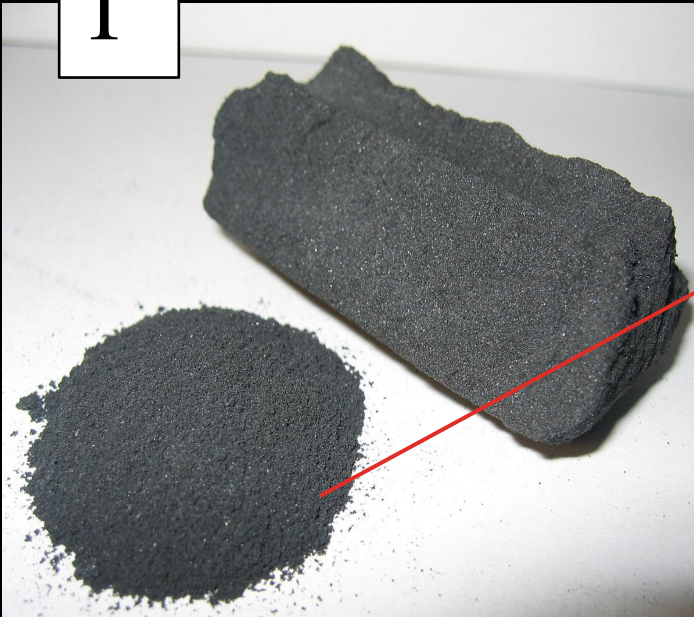
Activation increases charcoal's adsorption* capacity threefold, by creating an internal network of even smaller pores - allowing the charcoal to more effectively neutralize toxins, gases, and even poison.

*Adsorb: A process in which substances, such as gases or toxins, bend to the surface of a solid, forming a thin film, often only one molecule thin.

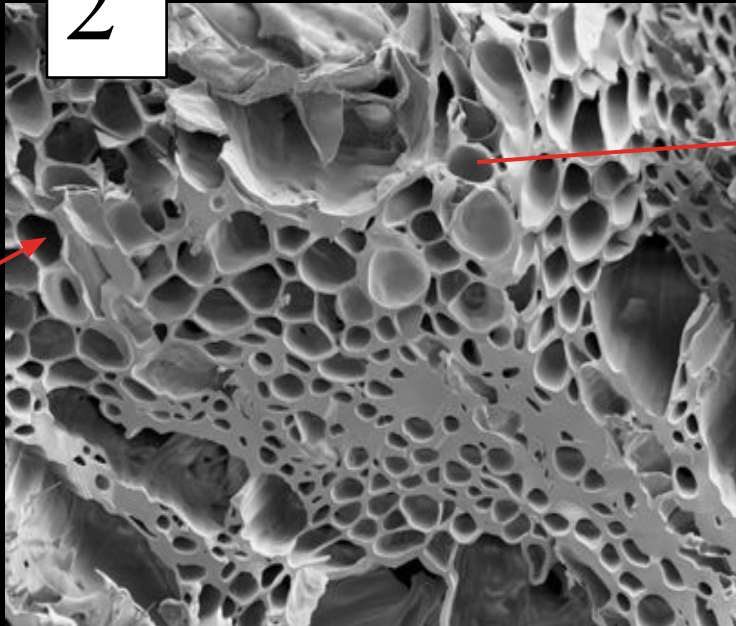
WHY ACTIVATED CHARCOAL

- Microcrystalline structure

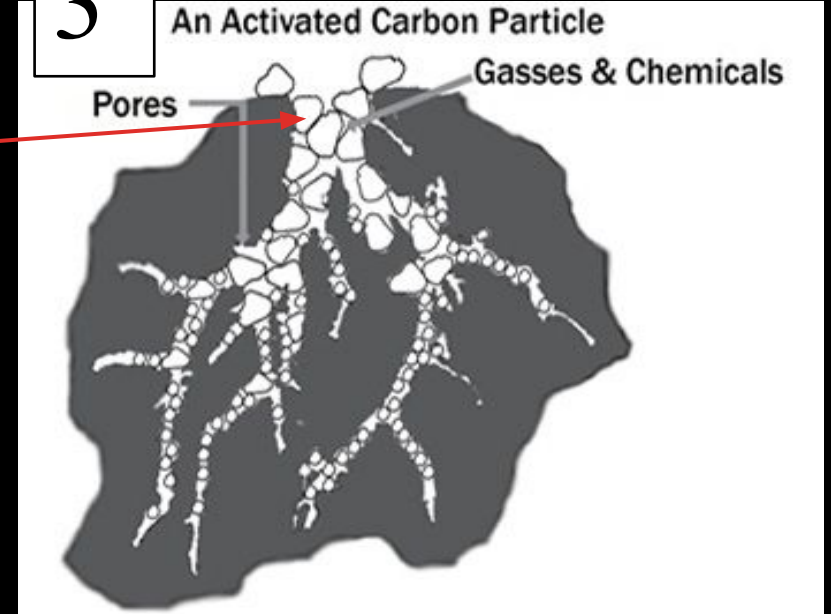
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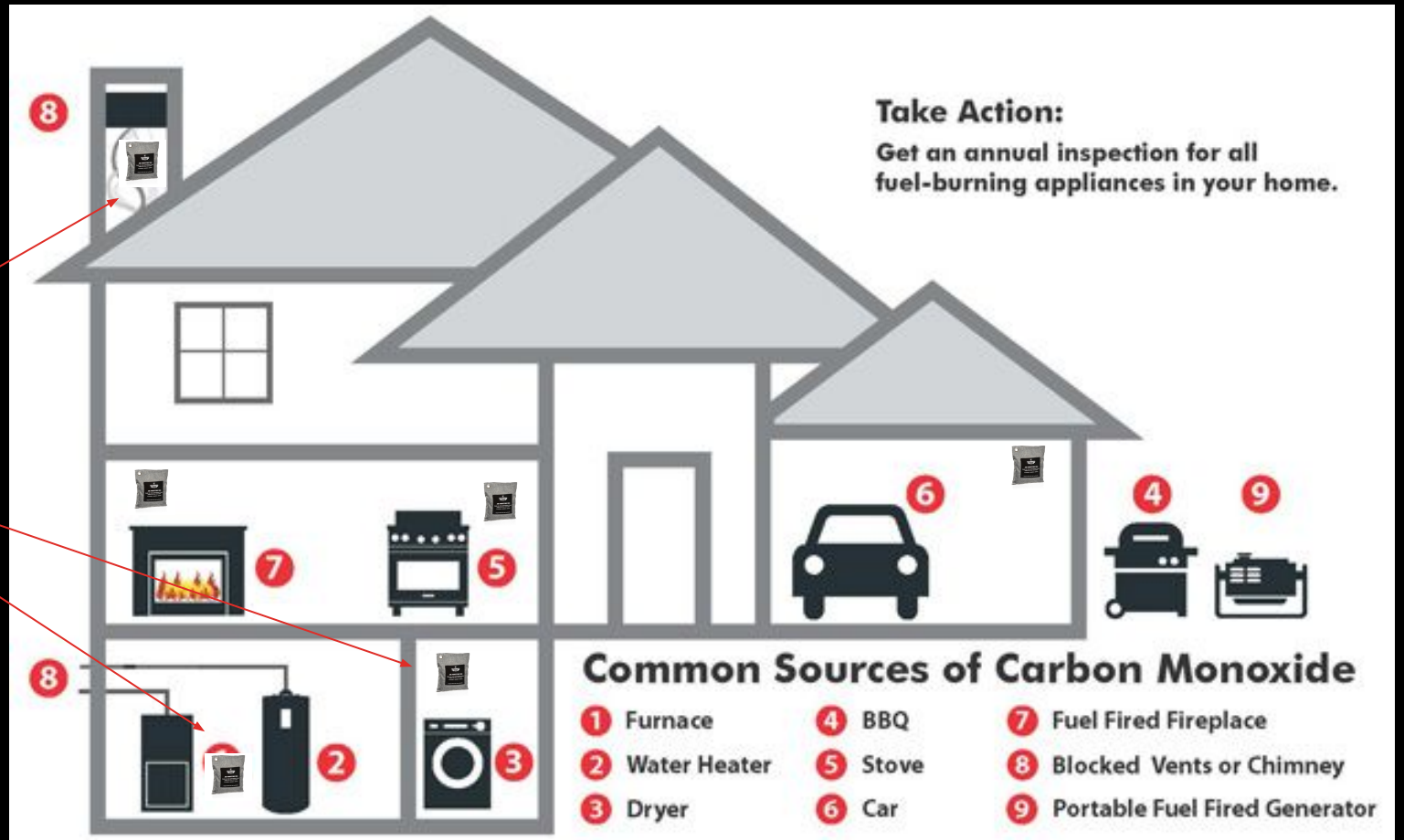


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IMPLEMENTING ACTIVATED CHARCOAL TO NEUTRALISE CARBON MONOXIDE

1.) AIR PURIFYING ACTIVATED CHARCOAL BAGS



ADVANTAGES AND DISADVANTAGES OF PURIFYING ACTIVATED CHARCOAL BAGS

ADVANTAGES	DISADVANTAGES
Affordable	Not enough material
Self-renewing	Volume needed to accommodate at home
Low maintenance	
Mobile	
Easy to obtain	

IMPLEMENTING ACTIVATED CHARCOAL TO NEUTRALISE CARBON MONOXIDE

2.) USING ACTIVATED CHARCOAL IN PLASTER

Contents of Plaster: Lime/ Gypsum, Water and Sand + **ACTIVATED
CHARCOAL**

How its used: The plaster is manufactured as a dry powder and is mixed with water to form a stiff but workable paste immediately before it is applied to the surface.

Use: Plaster is a building material used for the protective and/or decorative coating of walls and ceilings and for moulding and casting decorative elements.

ADVANTAGES AND DISADVANTAGES OF ACTIVATED CHARCOAL IN PLASTER

ADVANTAGES	DISADVANTAGES
Adsorbs the tiniest amount of carbon monoxide	You have to install it
Relatively cheap	Possibly compromises the strength of the plaster (don't put too high of a proportion)
The process isn't elaborate	
You're able to install a lot more activated charcoal	
Widely dispersed around the house therefore is likely to catch the carbon monoxide	

IMPLEMENTING ACTIVATED CHARCOAL TO NEUTRALISE CARBON MONOXIDE

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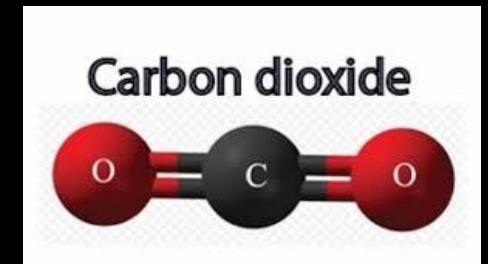
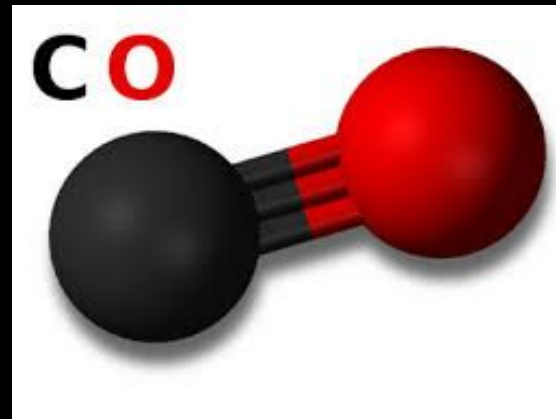
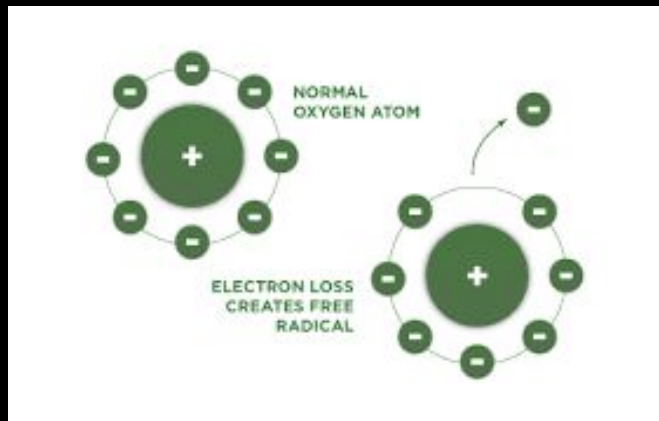
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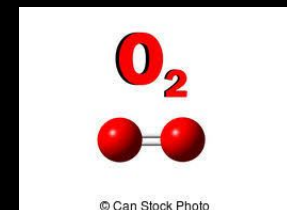
AIM - CREATE A DETECTOR THAT
DOES MORE THAN SIMPLE
DETECTION.

INITIAL IDEA

Add a component with in (already existing) carbon monoxide detectors that releases free radicals of oxygen towards source of carbon monoxide in order to produce harmless compounds.



OR



ASSESSING PRACTICALTY OF THE IDEA VIA REASERCH

What are free radicals?

- uncharged, highly reactive & short lived molecules that
- have an unpaired valency electron.

How will we make use of them?

- utilising the highly reactive nature of these entities in the following manner:

Free radical of oxygen + **carbon monoxide molecule** —————> **Harmless substances**

How will they be produced?

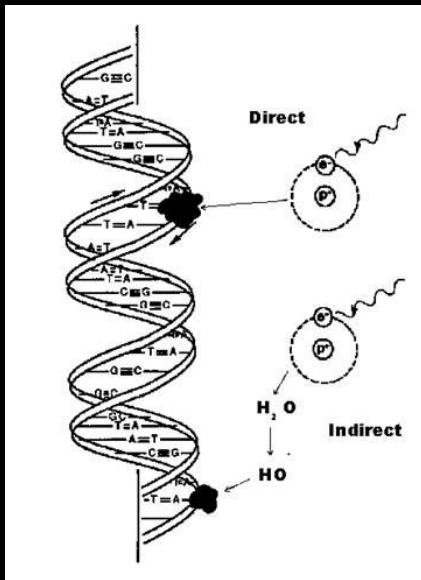
- Homolytic fission (initiated via a UV light source)

Risks:

- other molecules with in the air separating homiletically
- producing more dangerous free radicals
- difficult to incorporate the infrastructure needed for hemolytic fission into the detector.

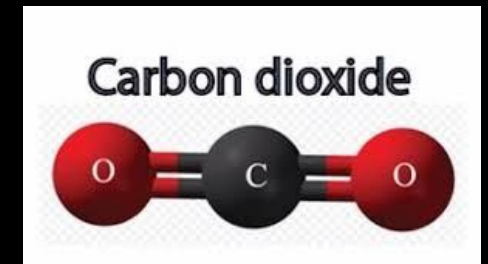
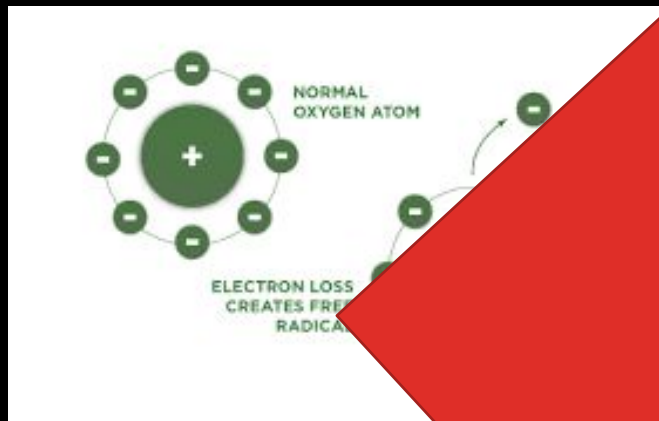
ASSESSING PRACTICALTY OF THE IDEA VIA REASERCH

Are free radical harmful?

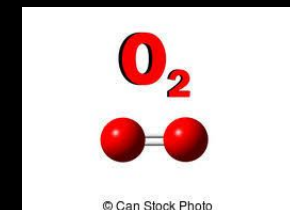


POTENTIAL IDEA

Add a component which releases free radicals of oxygen towards source of harmful compounds.



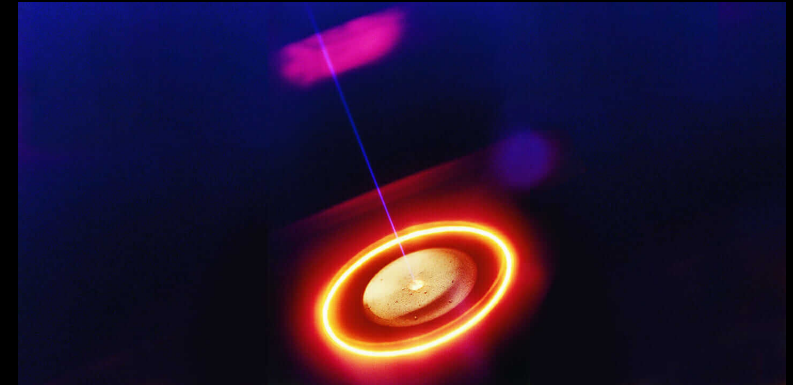
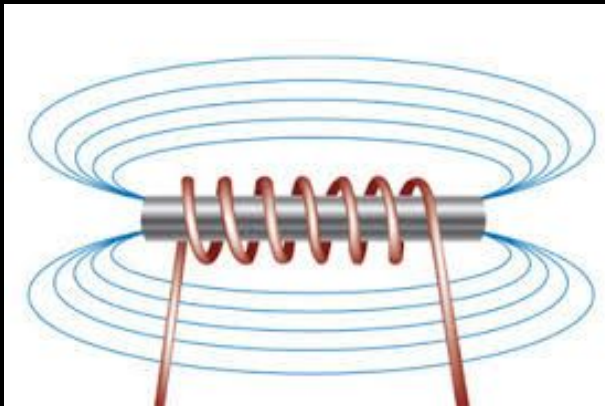
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MAIN IDEA

Our second ideas consists of the following additions being made to the detector:

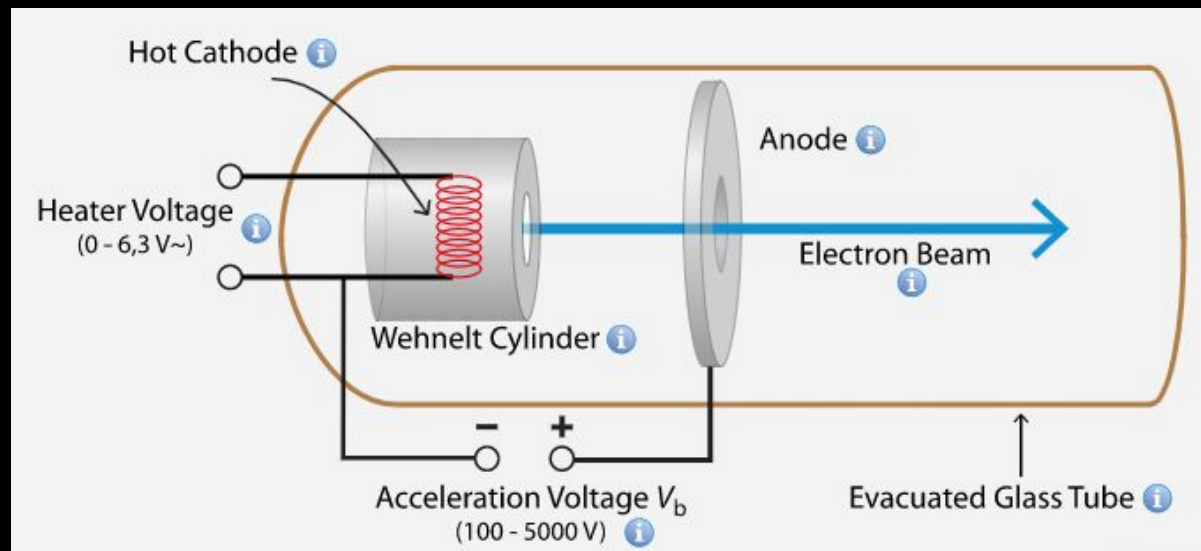
- An electron gun
- An electromagnet
- Lithium batteries



ELECTRON GUN

What is it?

- a device for producing a narrow stream of electrons from a heated cathode.
- <https://www.didaktik.physik.uni-muenchen.de/elektronenbahnen/en/kanone/klassisch/Simulation.php>



PURPOSE OF ELECTRON GUN

- Produce a beam of electrons which will ionise carbon monoxide molecules to form the following ions:
 - C^+
 - O^+
 - CO^+
- These ions will then react freely with other molecules in air to produce the following molecules:
 - CO_2
 - O_2

ELECTROMAGNET & ITS PURPOSE

Electromagnet

- Activated and deactivated manually.
- User allowed to choose between a + and - charge.

Purpose

- stop the flow of the electron beam
- (+) charge attracts back electrons left in the environment.
- (-) charge attracts back ions produced.

PURPOSE OF LITHIUM BATTERIES

Lithium

- very reactive metal
- gives away/ transfers its electrons very easily.

Purpose

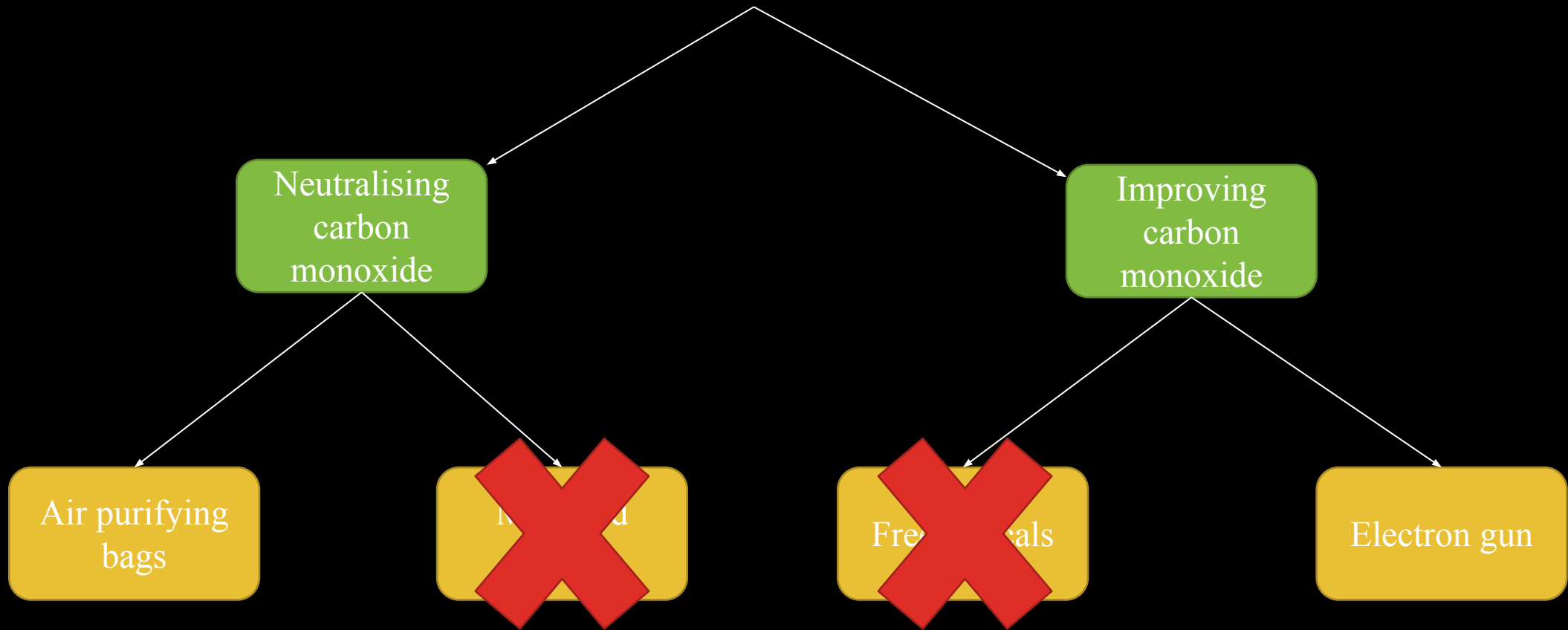
- Activate the detector
- Donate electrons to ions attracted back (to form atoms)

ASSESSING PRACTICALTY OF THE IDEA VIA REASERCH

Advantages:

- Does not reduce cost effectiveness of existing product
- Does not negatively impact the environment or individuls exposed to this.
- 3 features can be easily added into existing carbon monoxide detectors

Our ideas





REFLECTIO

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