

Final Mission Briefing



Astronauts, you and I are about to take science to a new level.

Dr Natalie Meyer, Flight Commander

Today we will leave behind our Earth laboratory.

We will journey to a science lab, 320 km above the planet.

Our destination is the International Space Station (ISS). It's an amazing place — and it's so big that it had to be built in space.

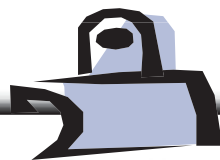
Our mission: To learn how humans can live in zero gravity.

You will need all your years of scientific training for the experiments we will be doing.

When you're ready, climb aboard Space Shuttle Discovery. Strap yourself in and prepare for the launch sequence.

Good luck, astronauts!





Mission message

To: Discovery crew
From: Mission Control, Houston
Priority: Urgent

CO₂
scrubber

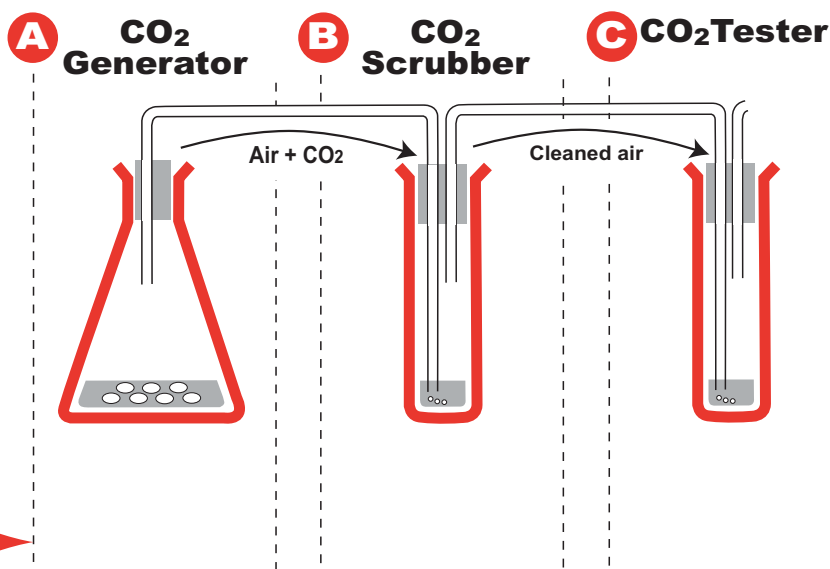
The problem:

During the spaceflight, the crew release large amounts of carbon dioxide when they breathe out.

The space station has a 'scrubber' to remove unwanted gases like CO₂ from the air, but it has malfunctioned.

You are going to have to build yourselves a home-made scrubber.

It will look like this: 

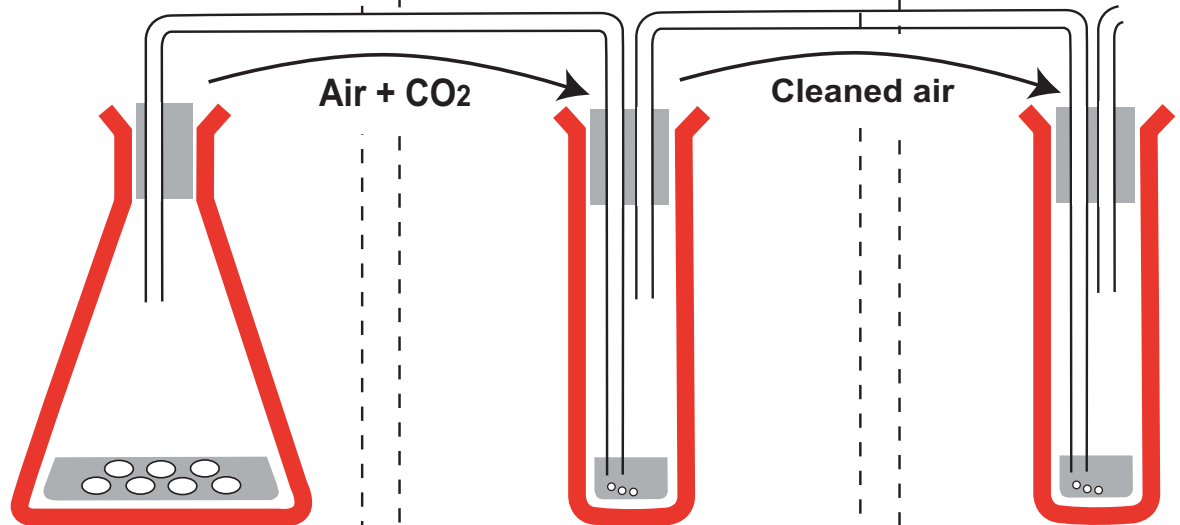


You don't have very long before the amount of CO₂ rises to dangerous levels. Work quickly.

Instructions

- Find out what chemical(s) you can use that will:
 - react together to produce CO₂.
 - detect when CO₂ is present.
 - Write your ideas on a planning sheet.
- Choose chemicals from the Space Station lab to use for the scrubber.
 - CO₂ is an acid gas. An alkali could neutralise it and remove it from the air. Test the chemicals available with indicator.
 - Write down the chemicals you will test as scrubbers on the planning sheet. Remember, the more you test, the longer it will take.
- Show your plan to the Flight Commander to make sure it is safe and sensible.
- Set up your apparatus and experiment to find the best CO₂ scrubber.
 - First, leave tube B empty (no scrubbing chemical). Start the reaction in the CO₂ generator. Time how long it takes for your tester to show that CO₂ is present.
 - Then, test each scrubber chemical in turn. Measure how long it takes until you can detect CO₂ in the tester. Make sure it is a fair test.
 - Write down your results on the sheet.
- Analyse your results. Which chemical makes the best CO₂ scrubber?
 - Report your findings to the Flight Commander as soon as possible.

A **CO₂ Generator** **B** **CO₂ Scrubber** **C** **CO₂ Tester**



SOLID = _____
SOLⁿ = _____
+

Substance 1 = _____
Substance 2 = _____
Substance 3 = _____
Substance 4 = _____

SOLⁿ = _____

RESULTS

Scrubber solution (in B)	Time until detect CO ₂ (in B) (seconds)
Substance 1	
Substance 2	
Substance 3	
Substance 4	

The best CO₂ scrubber is: _____

