



CO₂ Levels Activity

This activity measures the levels of carbon dioxide from different sources. When carbon dioxide is bubbled through water some of it dissolves creating a slightly acidic solution that will change the colour of the indicator solution. This activity can be run with two contexts

Context A - Planetary Atmospheres

Students have to identify which sample contains the highest concentration of CO₂ and identify which sample came from:

- Earth: CO₂ = 0.04% Will be undetectable by the indicator solution
- Earth Volcano = somewhere in the middle will partially change colour
- Mars: CO₂ = 95% or Venus: CO₂ = 96% Will be the highest level of acid detected by the indicator solution

Context B - Climate Change

One sample would be Earth atmosphere, one would be animal source or volcanic/natural source, one would be anthropogenic emissions source.

Set Up By Teacher/Technician

Each pair of children requires:

- 3 test tubes
- 3 plastic straws
- test tube rack
- <0.1% Bromothymol blue solution (you can get it as a Fish tank ph indicator). The solution needs to be diluted 1 part bromothymol blue to 20 parts water.
- One blue balloon pumped with Earth air (using a balloon pump) tied with an elastic band
- One green balloon blown up by a person (moderate CO₂ levels) tied with an elastic band
- One red balloon filled with car exhaust (use a funnel with wide end on end of exhaust and balloon on narrow end to capture the fumes into a balloon) tied with an elastic band
- Paper to write their findings



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Student Method

1. Into each test tube put approximately 3cm depth of bromothymol blue indicator solution.
2. Place a plastic straw into each test tube.
3. Untie band around the blue balloon and pinch it closed so no air escapes. Place the balloon opening over the straw of the first test tube and release the opening slowly to allow the balloon contents to bubble into the bromothymol blue solution in the test tube.
4. Time how long it takes for the solution to change colour. Note any changes in colour.
5. Repeat with the green balloon using the second test tube, and the red balloon with the third test tube.
6. Use the evidence to identify which balloon holds which sample.

Answer

The more CO₂ in the sample the faster the indicator changes because the quicker the solution turns acidic.