

Tasa de Ventilación de un espacio - Medición CO2

- <https://drive.google.com/file/d/1HwLhHk4XWmC1W1h9qFKI68KtveFufPV4/view>
 - guia_para_ventilacion_en_aulas_csic-mesura_v4.pdf

The renovation of air can be referred to by its acronym in English, **ACH**, Air Changes per Hour. If a space has 1 ACH (1 air change per hour), it means that in one hour, the volume of air entering the room is equal to the volume of the room. Due to continuous mixing of air, this results in 63% of indoor air being replaced by outdoor air. With 2 renewals, 86% is replaced, and with 3 renewals, 95%.

The required ventilation to reduce the risk of contagion depends on the room's volume, the number of occupants, the activity performed, the incidence of cases in the region, and the risk level one wishes to assume. The Harvard guide recommends **5-6 renewals of air per hour** for classrooms of 100 m², with 25 students aged 5-8 years, establishing this classification:

ACH (Renewals per hour of Air)				
6 IDEAL	5-6 EXCELENTE	4-5 BUENO	4-3 MÍNIMO	<3 BAJO

CSIC | idae | MESURA

The next step is to return to Step 3 and evaluate the ventilation rate with the windows open using the CO₂ reduction method (Option C).

Identify the start of the decrease: C_{start}=1794 ppm and t_{start}=9:16:26

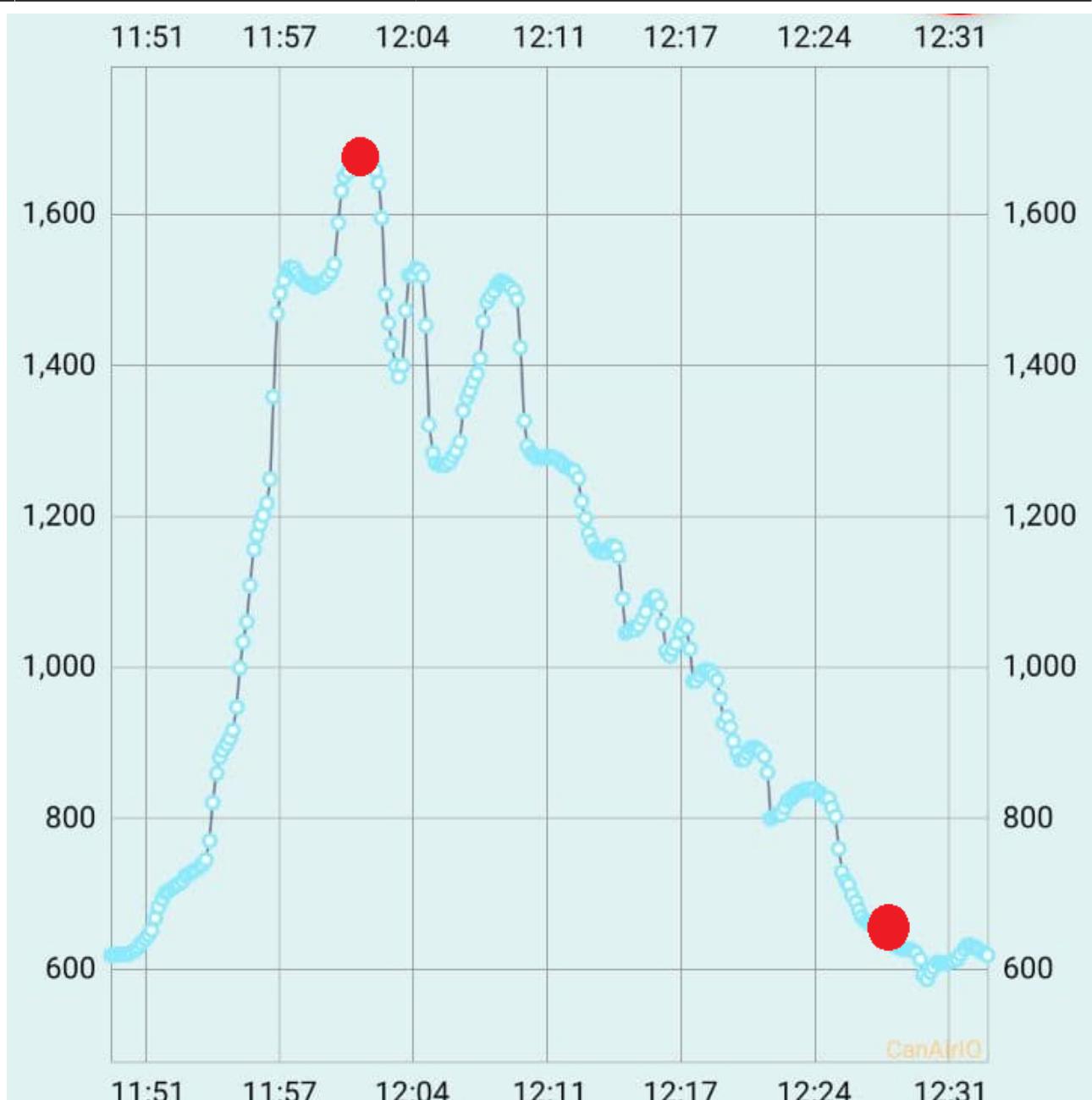
Identify the end of the decrease: C_{end}=475 ppm and t_{end}=9:42:46

Exterior concentration: C_{ambient}=400 ppm

Time: t_{end}-t_{start} is 26 minutes and 20 seconds. In hours, this is 26/60 + 20/3600 = 0.4389 hours

$$ACH = \frac{-1 \cdot \ln \left(\frac{475 \text{ ppm} - 400 \text{ ppm}}{1794 \text{ ppm} - 400 \text{ ppm}} \right)}{0.4389 \text{ horas}} = 6.7 \text{ ACH}$$

6.7 ACH is greater than the objective of 5 ACH. This classroom with its windows open meets the desired ventilation requirement. Further efforts should be made to increase the percentage of exterior air supplied by the ventilation system and install filters of higher quality.



- Enlazar ejemplo de datos a github

Calculador de ACH (Renovaciones por hora de Aire)

- <https://plotly-r.com/client-side-linking.html>
- <https://rstudio.github.io/crosstalk/shiny.html>
- https://gallery.shinyapps.io/crosstalk_03_summary/
- <https://davidgohel.github.io/ggiraph/articles/offcran/shiny.html#access-the-selected-values-1>

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