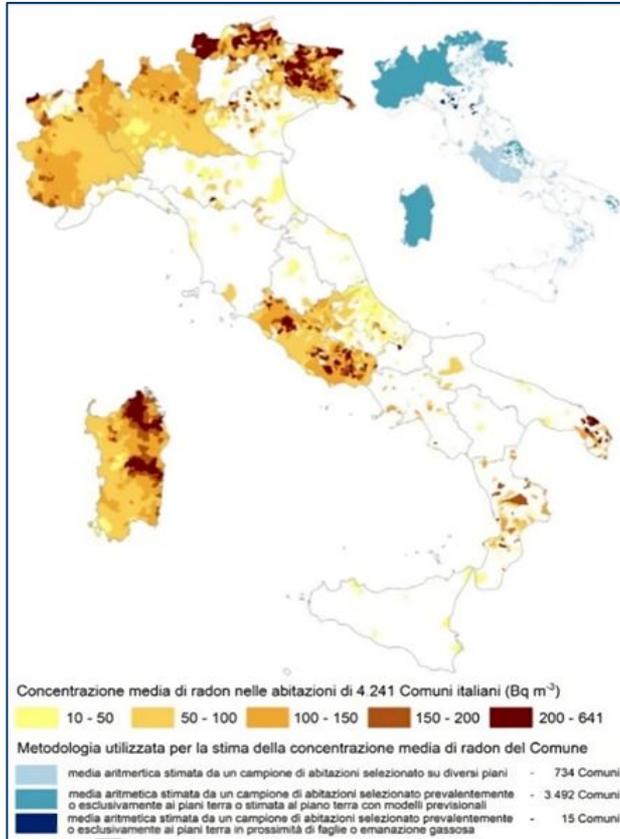


LA SITUAZIONE SUL TERRITORIO

A Saronno, la concentrazione media annua di Radon* nell'aria è di **70 Bq/m³**



*dati ISIN 2019

- *Secondo il Decreto Legislativo 31 luglio 2020, n. 101—> la massima attività di Radon nell'aria è **300 Bq/m³***
- *In futuro, nelle abitazioni costruite dopo il 31 dicembre 2024, la massima concentrazione sarà **200 Bq/m³***



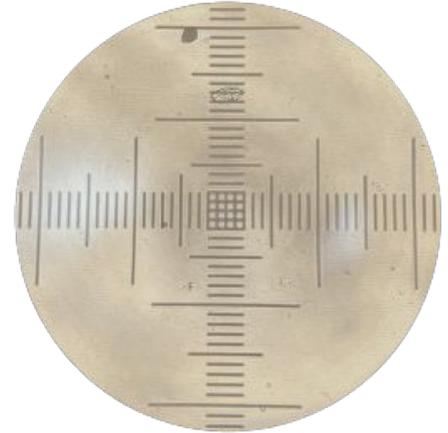
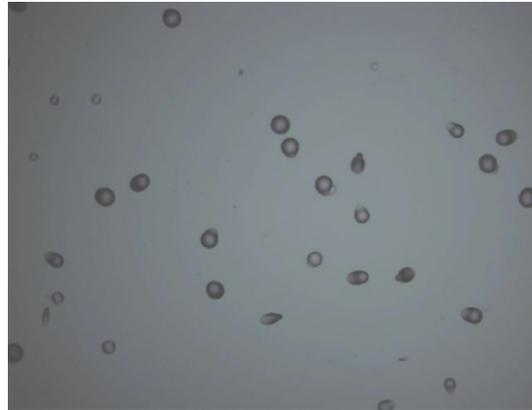
METODOLOGIA APPLICATA

Dosimetri CR-39 collocati in zone della scuola differenti per area e altezza dal suolo:



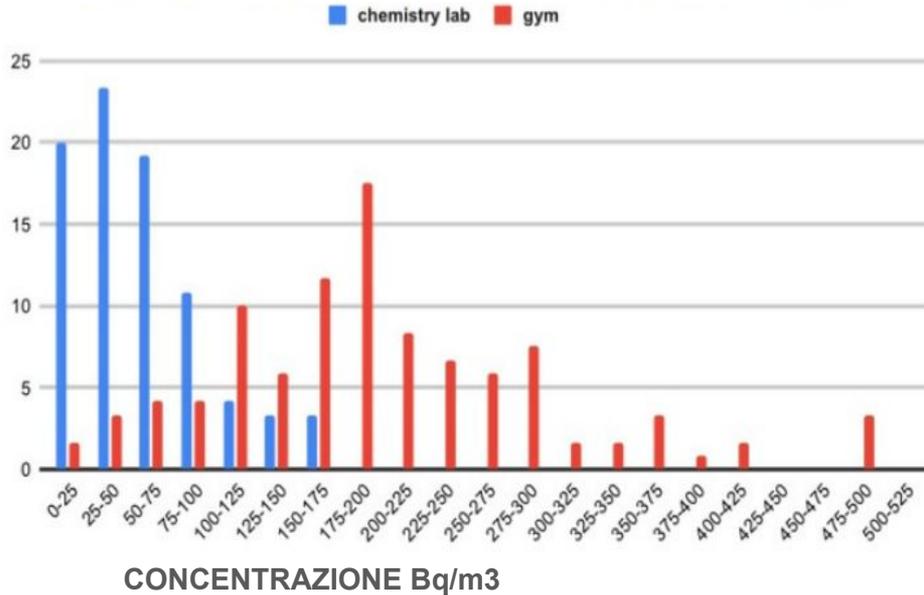
METODOLOGIA APPLICATA

Dopo **390 giorni** sono stati recuperati i dosimetri e sono stati sviluppati i vetrini contenuti in essi in una soluzione **6M di NaOH** per **5h** alla temperatura di **80-90°C**. Successivamente la classe ha analizzato le tracce di Radon presenti su di essi, ricavandone poi la concentrazione in **Bq/m³**.

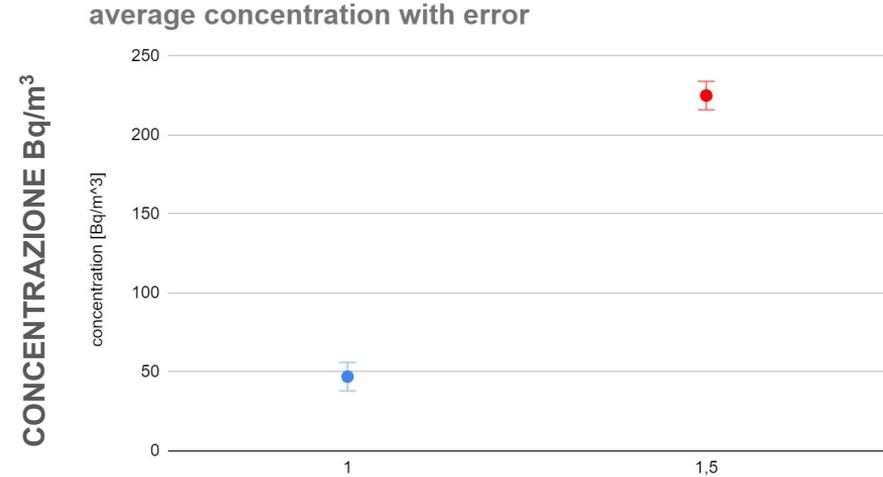


RISULTATI PROGETTO

Confronto stanze ad uguale aerazione e diversa altezza dal suolo:



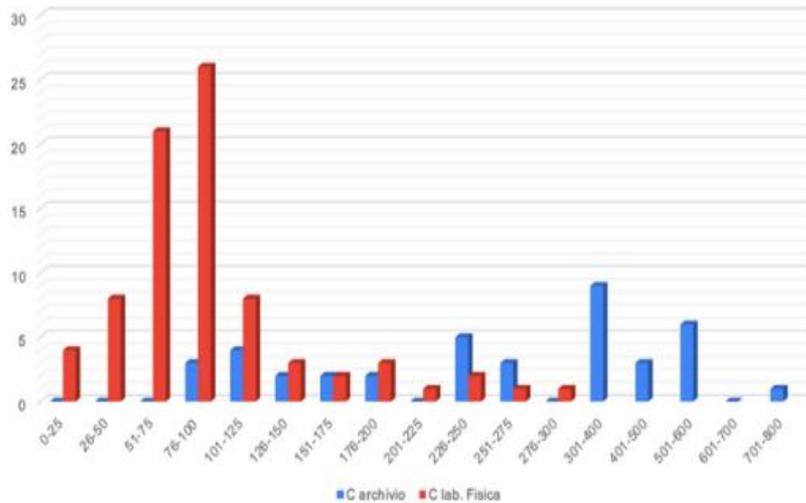
seminterrato vs secondo piano
con aerazione



- Laboratorio di chimica
- Palestra

RISULTATI PROGETTO

Confronto stanze ad uguale aerazione e diversa altezza dal suolo:



CONCENTRAZIONE Bq/m³

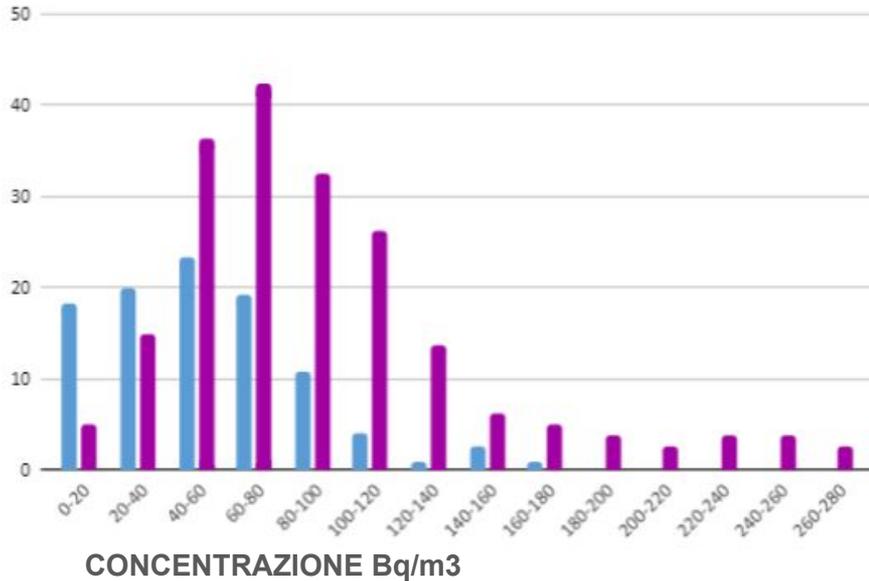
**seminterrato vs secondo piano
no aerazione**



● **Archivio**
● **Laboratorio di fisica**

RISULTATI PROGETTO

Confronto stanze ad altezze dal suolo uguali e diversa aerazione:



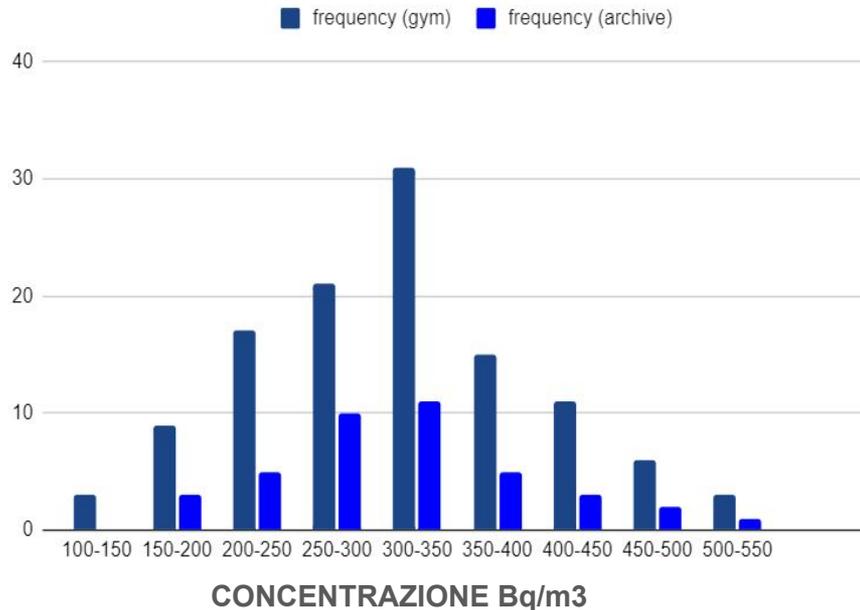
**Aule al secondo piano
con diversa aerazione**



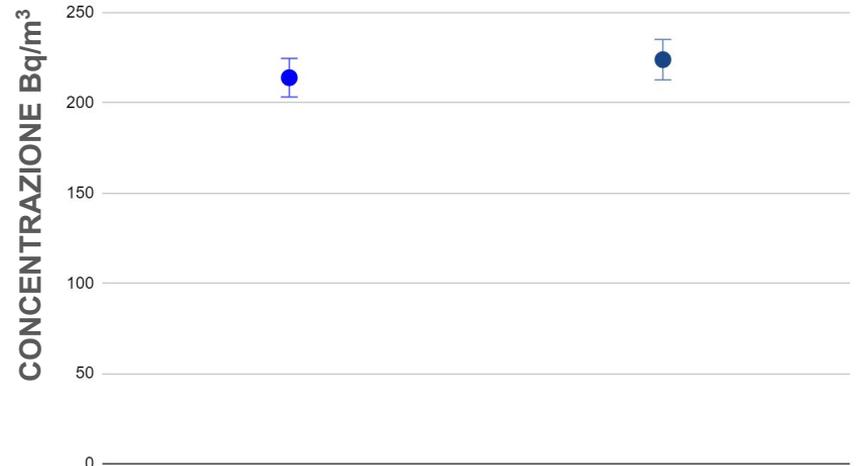
- Laboratorio di chimica
- Laboratorio di fisica

RISULTATI PROGETTO

Confronto stanze ad altezze dal suolo uguali e diversa aerazione:

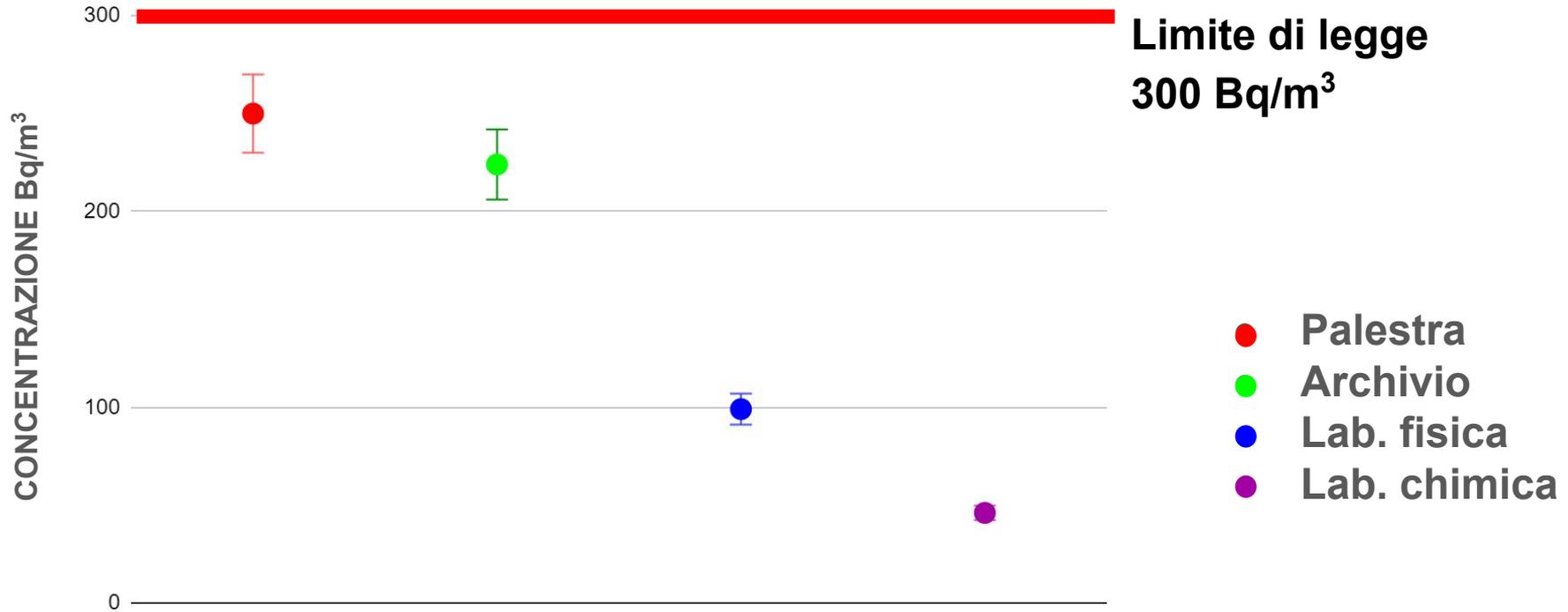


**Aule al piano seminterrato
con diversa aerazione**



- Palestra
- Archivio

CONCLUSIONI



I NOSTRI LAVORI

GB WILL THE SCHOOL BE SHUT DOWN?

RN-222

GRASSI SARONNO

Aresu Giulia, Morresi Federico, Petracco Roberto, Zanuso Annachiara

MATERIALS

- CR-39 detectors
- Caustic soda 6 Molar
- Slide holder
- Fryer
- Optical microscope (40X objective)
- Compute

radon
86
Rn
(222)



MOTIVATION

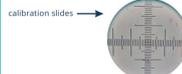
Wanting to demonstrate the difference on Radon's (Rn-222) concentrations - an odorless and colorless radioactive gas indicated as the main cause of lung cancer which accumulates in every building's basement- inside two significant floors of G.B. Grassi school of Saronno, we placed two Cr-39 detectors in the physics laboratory on the second floor and two detectors in the archive in the basement.

390 days after their placement, the detectors were picked up, chemically processed and analyzed with Excel.

METHODOLOGY

To determine the concentration of radon it's necessary to know the number of traces and the exposure time.

The CR-39 nuclear trail detectors remain imprinted when particles pass through them, damaging the molecules of the material hence it generates "traces". The traces are not visible macroscopically, it is necessary to enlarge them with caustic soda, thus making them visible under an optical microscope



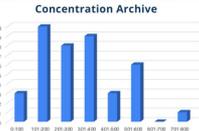
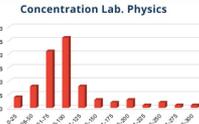
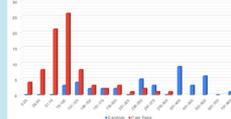
The chemical treatment procedure consists in dipping the detectors first in a 6 M caustic soda solution at a temperature of 371,15K, for 6 h ; afterwards the detectors are rinsed in distilled water

CONCLUSION

In theoretical terms Radon emanating from the ground or brought to the surface by groundwater disperses into the atmosphere, resulting in very low concentrations in open areas, whereas in enclosed spaces such as basements and semi-basements of buildings, elevated concentrations can be reached.

As we can see from our data the Radon's concentration from the Archive is higher than the Physics lab.

The first one was at the basement of our school building instead of the Lab that is on the 2nd floor



INDOOR RADON CONCENTRATION MEASUREMENTS

BY BRACCI GIORGIO, CODARRI ELISA, MACCARINI BENEDETTA, MAVELI GIULIA, PORRO TOMMASO

INTRODUCTION

The aim of this science project is to measure the concentration of radon (Rn-222) particles in different parts of our school and understand how height and ventilation can influence these results. Since radon concentration disperses in the atmosphere, we expect that in ventilated places and on higher floors the track numbers will decrease, while in unventilated rooms and on lower floors it will increase.

DATA ANALYSIS

First, we placed the Radon detector in the chosen locations and after 390 days we collected them. Next, we did the chemical development which consists in immersing the CR-39 in a thermostatic bath at the temperature of 80-90 °C for 5 hours.

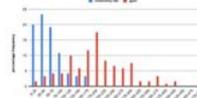
After we counted the number of tracks released by the radon particles with optical microscopes (microscope magnification of 40X and an area of 1.96*10⁻³ cm²). Next, we created an Excel document, which gave us the concentration of radon.

$$N' = \frac{180}{10,5 \cdot t} \text{ (Bq/m}^3\text{)}$$

Finally, we compared the results of two different places, the gym, and the chemistry lab, and came up with our conclusions.

MATERIALS AND METHODS

Percentage frequency versus intervals



Medium concentration with error



As we can see from the graph the percentage frequency of radon is higher in the chemistry lab at low floors, while in the gym it is higher at high floors.

The second graph explains the fact that the measurements obtained in the two different places are incompatible.

RESULTS AND CONCLUSIONS

The results we came up with, are consistent with what we expected: the radon concentration increases on lower floors and in unventilated places, and it decreases in ventilated places and on higher floors.



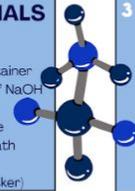
How much Rn-222 do we breathe?

1 INTRODUCTION

At the beginning of 2022 we have cooperated with the university of Milan to examine the presence of radon in the air. The aim of the project was to find different spots to install CR-39 detectors to be able to analyze the results 391 days later.

2 MATERIALS

- cr-39
- slides
- raid slide container
- solution 6M of NaOH
- bowl enough resistant for the thermostatic bath
- microscope
- pc (excel, tracker)



3 METHODS

1. Assemblage of CR-39, included every slice
2. Placement of them for 391 days in 2 different rooms; **the archive**, poorly ventilated, **the gym**, aired.
3. Extraction of the slices from CR-39 to put them in a thermostatic bath with a solution of NaOH for 5 hours.
4. Rinsing of the slices with water



Comparison

4 ANALYZING DATA

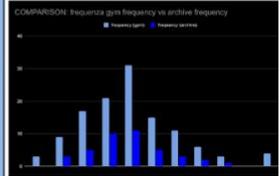
1. Calculation of the tracks from the 40 taken to the microscope
2. Entering datas on excel files
3. Calculation of the tracks per cm² then per cm³ (Bq/m³) with the error associated with the measures
4. Calculation of the frequency of each range of number of tracks
5. Production of an histogram with frequency's datas



A photo taken to the microscope where the tracks have been counted from.

5 CONCLUSION

In the end, the experiment's conclusion has confirmed our assumptions, indeed the radon's concentration in the archive is higher than the one in lobby despite both being in the basement, because the first location is less aired than the second one.



LA 5B SI RACCONTA

