https://www.tri-techtesting.com/Radon-Test-Methods.html

Comparing Radon Levels in Libby Middle High School After Installation of Heat Pumps

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Question

Have the heat pumps recently installed affected the radon levels in the school?

Is the student's safety and health relating to radon more secure now that they have been installed?

Background Information

Radon is a naturally occurring, odorless, tasteless, invisible, gas that is released from rocks, soil, and water. According to the EPA, they estimate that radon is the number one cause of lung cancer among non-smokers.

Out of Montana's 56 counties, 49, or 88%, have been assigned zone 1 categories. This means that those zone 1 counties have higher chances to build up high levels of radon.

Hypothesis

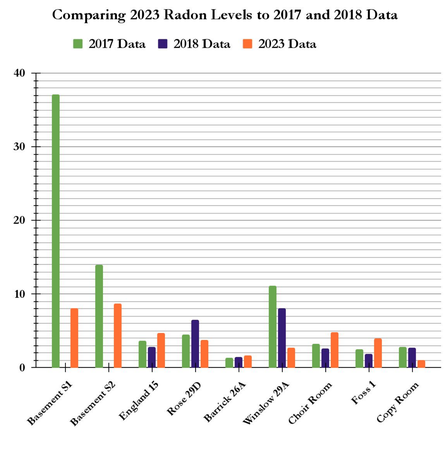
Hypothesis: The levels of radon will be lower than previous years due to the installation of heat pumps in Libby Middle-High School.

Null Hypothesis: There will be no statistical difference between the levels of radon from previous years and the levels after the installation of the heat pumps.

Method

We collected radon levels in the classrooms that were previously tested, and for each room we conducted three trials. We used two different machines. One was the *Safety Siren Pro Series 3 Radon Detector*, and the other was the *Safety Siren Pro Series 4 Radon Detector*. These two detectors gave us similar results when it came to testing the rooms, the only difference was their appearance and how easy they were to operate. After waiting the period to receive our data, we recorded the results and compared them to the 2017 and 2018 data. We completed three trials for each location. The 2017 data was collected by a group of students, and the 2018 data was collected by a professional organization House Detectives Inc. The heat pumps were installed in the summer of 2022.

Results



Rooms of Libby Middle -High School Tested:	Average 2017 Levels of Radon without Heat Pumps (pCi/L):	Average 2018 Levels of Radon without Heat Pumps (pCi/L):	Average 2023 Levels of Radon with installed Heat Pumps(pCi/L):
Basement S1:	37.1	N/A	8.1
Basement S2:	14.0	N/A	8.7
England 15:	3.7	2.8	4.7
Rose 29D:	4.5	6.5	3.8
Barrick 26A:	1.4	1.5	1.7
Winslow 29A:	11.1	8.1	2.7
Choir Room:	3.2	2.6	4.8
Foss 1:	2.5	1.9	4.0
Copy Room:	2.8	2.7	1.0

Conclusions

In five of the rooms tested (56%) radon levels decreased, while the rest increased minimally. There were several notable changes in certain areas. The basement of the school did not have any sort of heat pump in it, yet readings in both sides of the basement decreased dramatically. In 2017, the radon readings were 37.1 and 14.0 pCi/L. In 2023, the readings were 8.1 and 8.7 pCi/L. This is not explainable, other than some unknown increase in air circulation. Room 29A has no windows and, prior to the heat pumps, had little to no air circulation. The radon levels in this room from 2017 and 2018 tests were 11.1 pCi/L and 8.1pCi/L respectively. Following the installation of the heat pump the radon readings dropped to 2.7 pCi/L.

Variables including temperature, barometric pressure, and humidity could have affected the levels of radon in our experiments. Other factors such as airflow and student traffic could have affected our data.

References

- Environmental Protection Agency. (n.d.). *Health Risk of Radon*. EPA. Retrieved April 13, 2023, from https://www.epa.gov/radon/health-risk-radon
- *Montana radon mitigation, Testing & Levels - RadonResources*. RadonResources.com. (2014, April 4). Retrieved April 14, 2023, from https://radonresources.com/directory/mt/