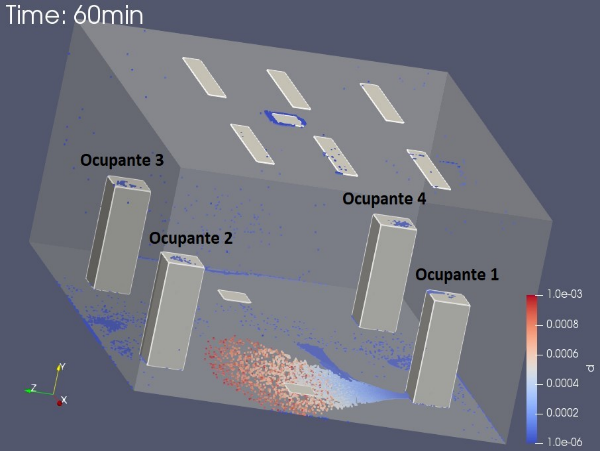
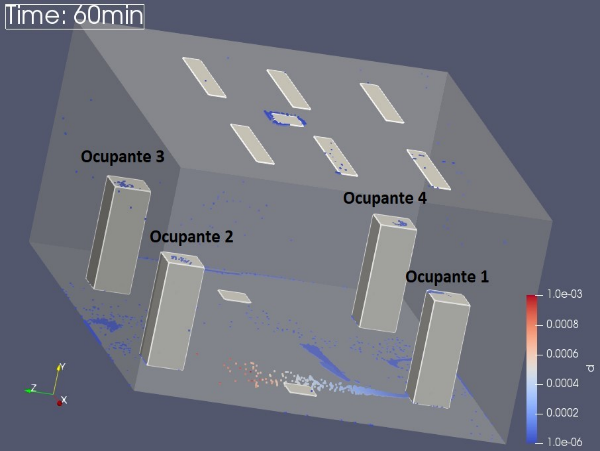
1. Considering what you just watched in the images and videos of the CFD simulations from class 3, and what was learned in classes 1 and 2, answer the following questions.
   1. Considering the images below, which represents the diagonal perspective of speaking and sneezing, state if there were any occupants who were more affected than others, in each simulation.

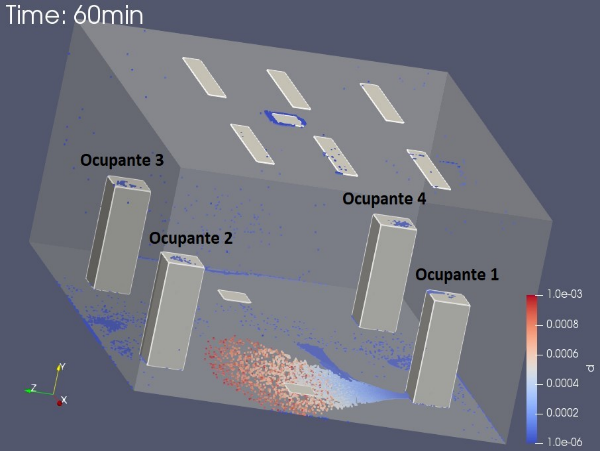


**Speaking**

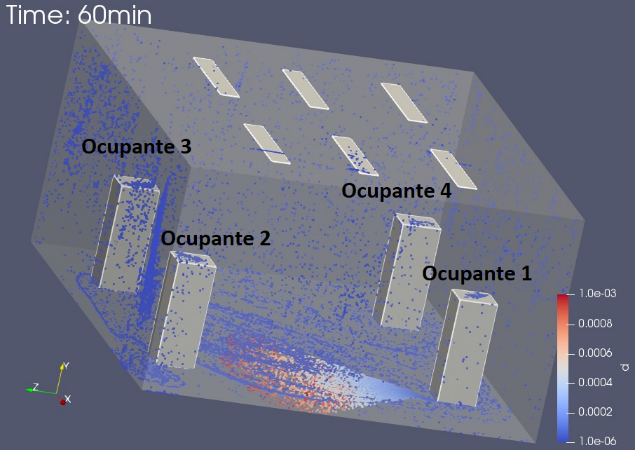


**Sneezing**

* 1. Explain why the differences observed between the CFD simulations in which occupant 1 spoke with and without ventilation. To help you, the images below represent each one of the situations.

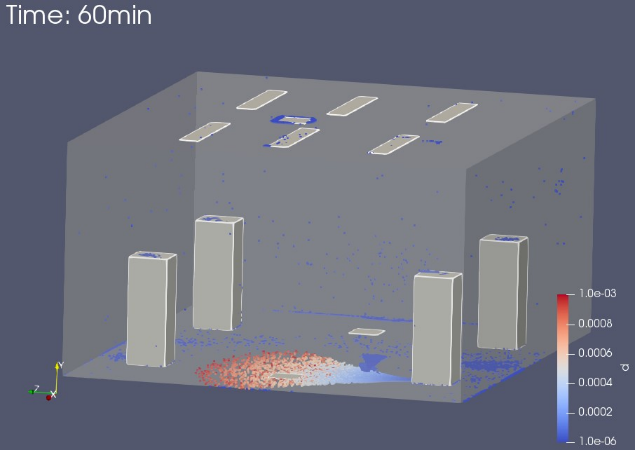
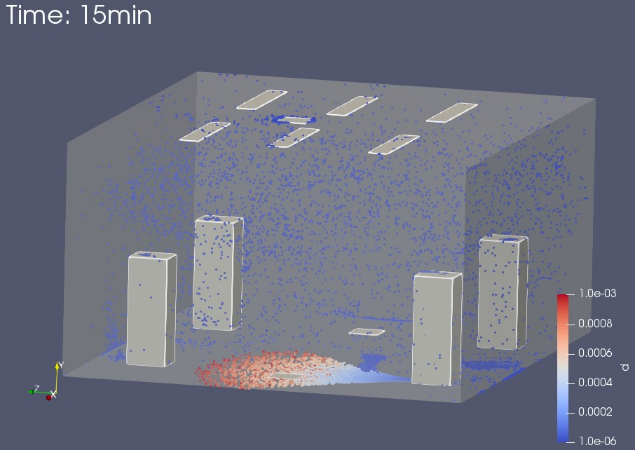
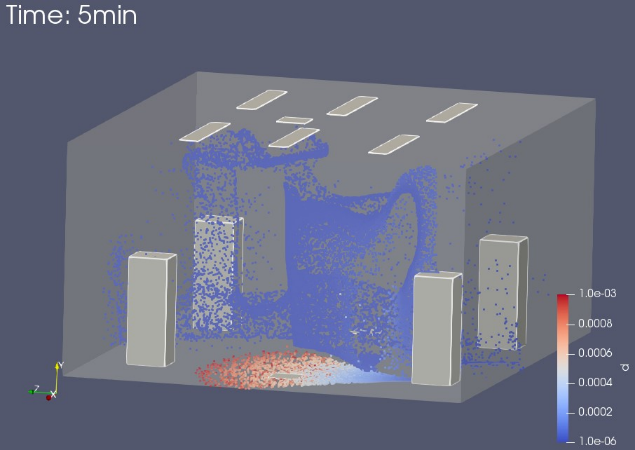


**Speaking**



**Speaking without ventilation**

* 1. As seen in class 1, the air drag force influences the flow of respiratory droplets. Considering the elements that are part of room 3 (occupants and ventilation system), how did each of these elements influence the flow of the particles? To help you, there are three images below representing the class during the speaking simulation on different times (5, 15 and 60 minutes, respectively).



* 1. During lesson 1, it was verified that several parameters influenced the flow of the respiratory droplets, such as temperature, pressure or density. Explain the reason why larger particles (oranges) were deposited in a greater number in the room, and the smaller particles (blue) were removed in greater numbers.
  2. Was the risk of infection for the occupants always the same for the three breathing regimes? Explain why.

1. According to the videos watched during class 3, and the answers given to the prior questions, develop a small scientific summary, highlighting the main aspects of what was analyzed: differences between breathing regimes, differences between having or not having a ventilation system, risks of infection, among others.

**To Learn More…**

If you would like to explore further about this class theme, on the Keywords Table there are several links available, with additional information, related to each keyword. To access this information, click on the corresponding link on the section “References”.

**Keywords Table**

|  |  |
| --- | --- |
| **Keywords** | **Reference Number** |
| How to make CFD simulations with respiratory droplets  Results of CFD simulations with respiratory droplets | **[1] [2] [3]** |
| Simulation videos of CFD | **[4] [5] [6]** |

**References**

**[1]**<https://re.public.polimi.it/retrieve/handle/11311/930957/444623/Numerical%20and%20experimental%20analysis%20of%20airborne%20particles%20control%20in%20an%20operating%20theater_11311-930957_Romano.pdf>

**[2]** [Microsoft Word - 2006Atmospheric Environment \_Zhao Zhang1\_.doc (psu.edu)](https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=0fe1dae233f76168f0e0448172a28ca2d21cc952)

**[3]** [Numerical Simulation of Coughed Droplets in the Air-Conditioning Room (sciencedirectassets.com)](https://pdf.sciencedirectassets.com/278653/1-s2.0-S1877705815X00282/1-s2.0-S1877705815027599/main.pdf?X-Amz-Security-Token=IQoJb3JpZ2luX2VjEHYaCXVzLWVhc3QtMSJIMEYCIQCpllZJpZO1irDxfouaVBqqSs4sN5BImK6cqCr8BGM48AIhAOAXLn%2BUnwWRD%2F6K8TbVIXw%2FEO8Ae1zq7RfxP7KmLs6LKrsFCO7%2F%2F%2F%2F%2F%2F%2F%2F%2F%2FwEQBRoMMDU5MDAzNTQ2ODY1Igy7z%2FJF6hEcm58LqRQqjwU2zMnGUcSF26cO6LK%2F9K3u3PJHqzC1NYDnVl1T7ONGWBDJB%2FZbnGiqbnfeXTMWmsu5GQHGMvOzGeEJijlyoyIl5mPFeYSXeAaGAJTtpaVHXbFXgXDyx0UfTO9nOZSroTHHkpu8bKd7FP%2BPZ8iPN%2FkO%2BMlXcv7fRCVEXzFNzSqr0sK7TBda9%2FIFbjOLTziH9QCaTPF5rX8%2F6GGz43SDavre7MsKxTypv1jCp78zpbxzakBowOayDAPxOA6qypvDYpyIENs8zpg7OUbaR3jOup4B5bLIUAWY38eTyEEe%2BMlsUJUnnQmy27skz0i1zfmQ8qBGtYmyCsXeZ%2BZv0PhMWTIB%2BPtLjTK%2BUoC%2BTySndB%2FI1n7MB6xgn5l7%2BalnnDf%2BNjEQvJgNFnUSgK7zn2ExmXqS%2BMoFIHyMhph11mOOfAr6F6Q51%2F4%2FDLE9oBhZxGa%2BDgkMxstTv%2BzfAulqPcY59LZxogqVxvDGAwGFY3PQM%2BXmlxYK5FhnCcxV4dtjvUSTOCFOBorKpr8%2FhMiqERiliyt%2Fy7fcQ7IvHLjbF2T71QXH97PTp50DOH1PMWMkF8lVSf0bYJ%2BniCTTD%2FByUTLDULnqBqj53BKE73lVEw%2Bnp1dBg8jmA0KAQEqB7j5DqmsdNJFpGhpWvEh2lMZzWcMhfZvHXJL6ZrBynVFIDqwlZNLwn6rgbEv3hMVOdL7dCDpjvXXJoJ9d%2Fr2nXXz1wP3OS3RVj7ybFcm6tuD2Huh0vjKU%2BqLCH6082UqVzlq8bjhZ985EqcbU7lfwlQKUKV5DWI62CkooVoCez9CdhBQULVuz%2BpNy5y8U6k61%2Fb%2Fd%2Bkfg6kzvyzNx4HOSCUE4hKOE8%2B8xdeQSeoIBT13cM4CF%2FJ3eMJv0v6UGOrABpgphmfsqYGRiyr8mwehPX6Y9QT0fG3sBiKiFfD%2FjXoSLOLE7GM7lpmn8vKhkfqpSA0994yhy0E4ZpLSLlWgqjvxuyEao31Y3g6AYdFUrL997zKUmqJyEDCmqfeFiI5ojsp2ddlWXLEv%2FkemvaKoYjvhj%2F0diNpUJjwr8tjDG8H5b%2Fu0yXv1uw1KpQkUEEvEc1Y0%2B%2B8B3LRcJOoCPdC2le4bH0xmYAuclswJeQtyopyA%3D&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Date=20230713T141757Z&X-Amz-SignedHeaders=host&X-Amz-Expires=300&X-Amz-Credential=ASIAQ3PHCVTYWY4EFEP5%2F20230713%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Signature=e2f951c7815044038be353770ad5ebbfc5153662ae1f126048453cb515121fe6&hash=4d145210c06416e66ffaeacaa035d80304681b14cd8deb8282793dca322531a3&host=68042c943591013ac2b2430a89b270f6af2c76d8dfd086a07176afe7c76c2c61&pii=S1877705815027599&tid=spdf-0709b412-777d-4908-8e42-7c8e14376964&sid=0a46883649c281487e1b30f8d44e1352f241gxrqb&type=client&ts)

**[4]** [CFD simulation - YouTube](https://www.youtube.com/watch?v=GKaOGM8oIJ4)

**[5]** <https://www.youtube.com/watch?v=GKaOGM8oIJ4>

**[6]** [(11) Simulation shows droplets in human breath - YouTube](https://www.youtube.com/watch?v=JtHso9JtgSc)