AI SAFETY SANDBOX · BIOSECURITY

Make the physics of airborne infection clear

Starter · A weekend · Free · Step-by-step guide

Online version: https://ai-safety-sandbox.vercel.app/projects/infection-physics-explainer/

Summary

Why does distance matter less indoors? Why does ventilation help? Turn the physics of how infectious particles move and build up in air into a clear explainer or interactive sketch.

Why it matters

The source list argues infection physics should be part of standard teaching. Clear explanations help people make good choices about air, masks and rooms.

What you will have at the end

An explainer, a worked example sheet, or a simple interactive calculator.

Steps (tick each box as you go)

- [ ] **1. Choose your audience (15 min)**
  University students? School pupils? Building managers? Your audience decides the level of maths.
- [ ] **2. Learn the core model (2 hr)**
  Study the simple “well-mixed room” model: particles are added by people and removed by ventilation, filtration and settling.
- [ ] **3. Build one worked example (2 hr)**
  Pick a realistic room and show how the concentration changes with more ventilation or a purifier.
- [ ] **4. Make it visual (2 hr)**
  Draw a diagram, chart or tiny calculator. One clear picture beats three pages of equations.
- [ ] **5. Test and publish (1 hr)**
  Ask someone in your audience to work through it. Fix the confusing parts and share.

What you need

- Comfort with basic algebra
- A spreadsheet or drawing tool

What you will learn

- How airborne transmission works
- Simple mathematical modelling
- Teaching quantitative ideas

Key terms

Air changes per hour (ACH)
How many times per hour a room's air is replaced with fresh or cleaned air. Higher ACH means airborne germs build up less.

Source and links

Hatta & Bazarragchaa — A hundred project ideas in biosecurity (2025)
https://casualphysicsenjoyer.com/Essays+in+progress/Biosecurity/A+hundred+project+ideas+in+Biosecurity

When you have finished

Write a few paragraphs on what you did, what you found and what you would try next, and share it with a friend, your society or online.

Courses, mentors, small grants and communities:
https://ai-safety-sandbox.vercel.app/next-steps/

Questions? Ask in AI Safety Cardiff University (AISCU): https://aiscu.org/

Notes