



Facilitator's Guide

From Inhaler to Lungs: Teaching the Science Behind Breathing Medicine

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Ansys Software Used

This resource uses Ansys Fluent® fluids simulation software.

Resource overview

This guide supports the integration of a set of slides, titled “From Inhaler to Lungs: What Happens When You Inhale Medicine?”, into the classroom.

This resource helps students explore what happens inside the body when medicine is inhaled. Linking biology, physics, and health science, it guides learners to discover how air moves through the respiratory system and how medicine particles travel with it. Through short explanations, hands-on activities, and discussion prompts, students investigate ideas such as airflow, particle size, gravity, and turbulence, and see how these factors affect where medicine ends up in the lungs. Simulation images and videos are used to visualize these processes. The goal is to build curiosity and connect classroom science to a real-world application that many students can relate to, like using an inhaler.

The additional PDF page *“From Inhaler to Lungs – Understanding the Science behind it.”* introduces the key physical forces and mechanisms that determine how inhaled medicine travels through the airways and reaches the lungs. Designed for high-school learners, it offers short, curiosity-sparking explanations of concepts like gravitational settling, Stokes’ law, particle relaxation time, turbulent dispersion, changes in speed and direction, and how airway shape affects airflow. It serves as a teaser for the deeper science behind inhaler function and sets the stage for further exploration, i.e. *“Expanding Exercise Suggestion”* on the next page.

Zip File Contents:

1. Read Me Facilitator’s Guide (this document)
2. Power Point Files
3. PDF page

Age Range: 6-99

This resource was designed to tell a story, give food for thought and inspire knowledgeable discussions.

It is worth noting, that we intentionally use simplified language avoiding specific jargon, to make the topic understandable and relatable for children and anyone trained outside of this subject area.

Excluding the PDF, the resource can be used with children aged 6 and older. The PDF serves as an additional document with information high school students might find useful.

The focus is on getting the participants (whether young or old) to talk about STEM topics as a group, no matter at which depth, and think outside the box and be inspired.

Learning Objectives:

After going through this activity, learners will gain a basic understanding of:

- Links between biology, physics, and health science
- Structure of the respiratory system
- Effect of the medicine on narrowed airways
- Links between airflow, particle size, gravity, and turbulence
- Value of simulation in health care

Format Suggestion:

We expect it to take **45 minutes** to go through this exercise, depending on the depth at which the included questions and activities are incorporated.

Expanding Exercise suggestion:

Additional time is expected when adding the use of the PDF page *“From Inhaler to Lungs – Understanding the Science behind it.”*. Time can range from 30 min for reading the page and discussing it briefly in class to several hours when adding group work based on the page. Group work can include looking up the terminology mentioned on the page in textbooks, as well as summarizing findings, presenting those to classmates, and drawing conclusions.

Prior/Supplemental Knowledge Required:

No prior knowledge is required for the use of this resource.

Additional Resources:

Related Resource:

- [“Effects of Spacer Devices in pMDI Drug Delivery with Ansys Fluent Software”](#)
This resource covers the same topic as this resource, but in much more depth at university level.

Other resources for pre-university teaching on a variety of topics:

Ansys Everyday Engineering Videos (2-3 min):

- [“Why Golf Balls Have Dimples”](#)
- [“Why We Put Our Phones in Airplane Mode”](#)

Other Ansys pre-university resources:

- [“Why this shape? Exploring the historical and structural significance of the Arch part 1”](#)
- [“Materials Intelligence: the Card Game”](#)
- [“Selecting Materials for Musical Instruments: a Case Example with a Xylophone”](#)
- [“Our impact on the planet: let’s make it a good one!”](#)
- [“Life’s Engineering Tales: Grandma’s Hip Replacement”](#)
- [“Life’s Engineering Tales, featuring: An element’s journey”](#)
- [“Life’s Engineering Tales: featuring whale-inspired wind turbines”](#)
- [“Life’s Engineering Tales: What kind of engineer could you be?”](#)
- [“How Walkie Talkies Work: an Exploration for Children using Ansys HFSS Software”](#)
- [“Exploring Material Properties via Experiments and Property Charts: the Game”](#)

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Document Information

This case study is part of a set of teaching resources to help introduce students to topics related to fluids.

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