

The Anatomy of a Threat

Tobacco's biological and environmental impact:
from the cell to the planet



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Grade/Age: 7 (2nd secondary), Age: 13



L'Anatomie d'une Menace

*L'impact biologique et environnemental
du tabac, de la cellule à la planète.*

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Why this case stands out

Visualises complexity

A highly visual toxicological dossier makes invisible biological processes concrete.

Connects systems

The learning journey moves from organs and chemicals to environmental pollution.

AI creates the material

NotebookLM is visible as the production tool behind the student-facing dossier.

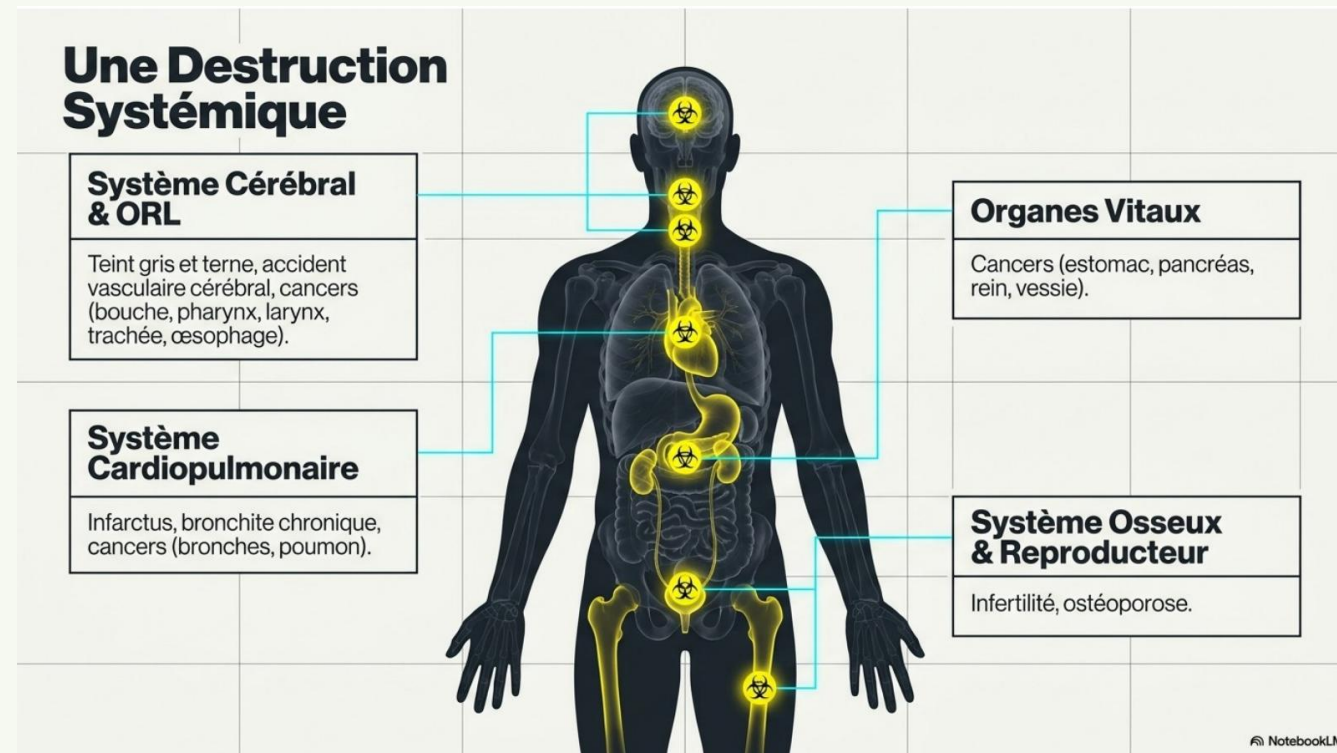
Builds one coherent story

The final synthesis links the human body and the planet through “shared vulnerability”.

The learning challenge

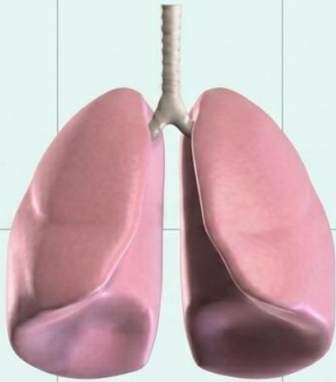
The material asks students to see tobacco not as a single-organ issue, but as a systemic biological and environmental threat.

- Effects across body systems
- How tar, carbon monoxide and nicotine cause damage
- The chemical load associated with tobacco smoke
- How individual consumption scales into environmental pollution



The entry point: make the threat visible

La Première Ligne de Front



Poumons Sains



Poumons de Fumeur

L'appareil respiratoire est le premier écosystème
à subir l'assaut chimique.

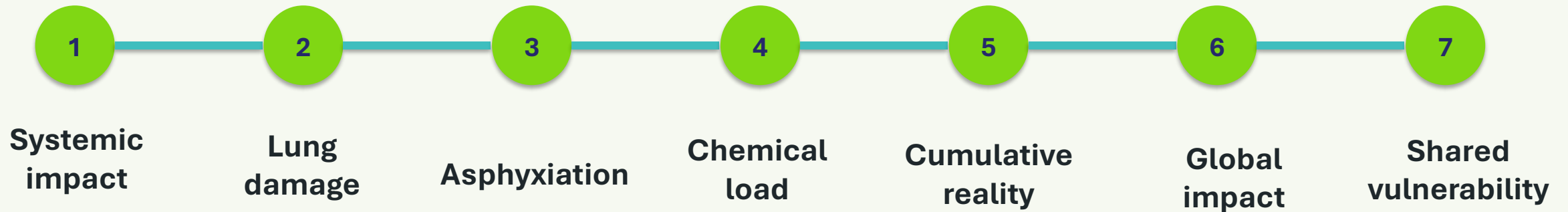
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The respiratory system is presented as the first ecosystem exposed to the chemical assault.

This visual comparison provides an immediate, concrete bridge into the toxicological analysis.

Healthy lungs ↔ smoker's lungs

Lesson at a glance



**A deliberate progression from the body →
the chemicals → accumulation → the planet.**

Where AI enters the lesson

NotebookLM

used to produce the visual student learning dossier

The AI contribution is not presented as the learning objective. It supports the teacher in turning source content into a coherent, visual sequence for students.

La Charge Chimique : Une Taxonomie Industrielle



L'Atelier industriel

Méthanol :

Alcool toxique (antigel, carburant, résines).

Chlorure de méthyle :

Gaz toxique (peintures, solvants).

Acétonitrile :

Solvant (plastiques, acrylique, caoutchouc).



Le Laboratoire toxique

Phénol :

Acide extrêmement toxique.

Acroléine :

Liquide toxique aux vapeurs irritantes et cancérogènes.

Formol :

Gaz désinfectant et cancérogène.



Le Système de livraison

Nicotine :

Poison utilisé comme insecticide.

Goudrons :

Substances se déposant sur le filtre.

Monoxyde de carbone :

Gaz asphyxiant.

A signature concept: cumulative impact

La Réalité Cumulative



Soit le volume exact de deux pots de yaourt de goudron pur
tapissant les poumons chaque année.

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The dossier uses
scale and comparison

to make cumulative
exposure tangible.

The visual representation turns an
abstract idea (repeated exposure over
time) into something students
can immediately grasp.

From personal health to planetary impact

Le Rayon d'Impact Global

4 500 000 000 000

Plus de 4,5 billions de mégots toxiques sont jetés chaque année dans le monde entier, transférant la charge chimique de nos poumons vers notre environnement.

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The lesson widens the frame.

Tobacco is presented not only as a personal health threat but also as an environmental issue, with cigarette-butt pollution transferring chemical burden into the wider ecosystem.

The synthesis: shared vulnerability

Synthèse : La Vulnérabilité Partagée



Le Filtre Biologique

Les goudrons et produits chimiques industriels s'accumulent et détruisent l'écosystème interne humain.



Le Filtre Planétaire

Des billions de mégots s'accumulent et diffusent ces mêmes toxines dans l'écosystème mondial.

Une seule et même pollution. Fumer n'est pas qu'une menace personnelle ; c'est une destruction environnementale à grande échelle.

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Biological filter

Tar and industrial chemicals accumulate in the human internal ecosystem.

Planetary filter

Discarded cigarette butts accumulate and diffuse toxins into the global ecosystem.

One pollution story, viewed at two scales.

What another teacher can borrow

- 1 Start with a strong visual contrast**

Use one image pair to make an abstract scientific issue immediately observable.
- 2 Sequence from micro to macro**

Move from organs and mechanisms to cumulative and environmental consequences.
- 3 Use AI to curate, not replace teaching**

Let AI help transform source material into a coherent student-facing learning resource.
- 4 End with synthesis**

Close by connecting individual facts into one larger systems-level understanding.

THANK YOU!

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