

LEARNING.PPNC.EU · AND RELATED TOOLS

Create, check, connect.

for every language section of the European Schools
starting with mathematics and physics

By teachers, for teachers.

Mark Popenco · Mathematics & Physics · European School Alicante

ONE QUESTION FIRST

What is the one thing no school can buy more of?

Time.

WHO IS TALKING TO YOU

A teacher who has run school IT and data protection



Mark Popenco

European School Alicante

Mathematics & physics teacher

since 2016 · European School Alicante since 2023

Careers counsellor, German section

since 2024 · European Baccalaureate rules · converting Bac grades for German universities

Head of digital strategy of a school

2018–2023 · 1:1 iPads, school network, Moodle, teacher training

Data protection officer of a school

2018–2023 · GDPR compliance for pupils and staff

M.A. School Management

TU Kaiserslautern, 2022 · organisational development, quality management, school law

University certificate: Digital Education Processes

TU Kaiserslautern, 2021 · digital school development, IT change management

Why it matters. How it works. What it brings.

WHY

Pupils deserve the best material

Today every teacher, in every section, builds it alone: time that does not reach the pupils.

HOW

Create, check, connect

One syllabus, AI guided by a curated knowledge base and growing validation rules, data protection by design.

WHAT

What pupils get, and the time teachers win

Live demo: learning paths, worksheets, tests; then the time saved.

...and where it can go next.

39 schools, one syllabus: every teacher builds alone

13

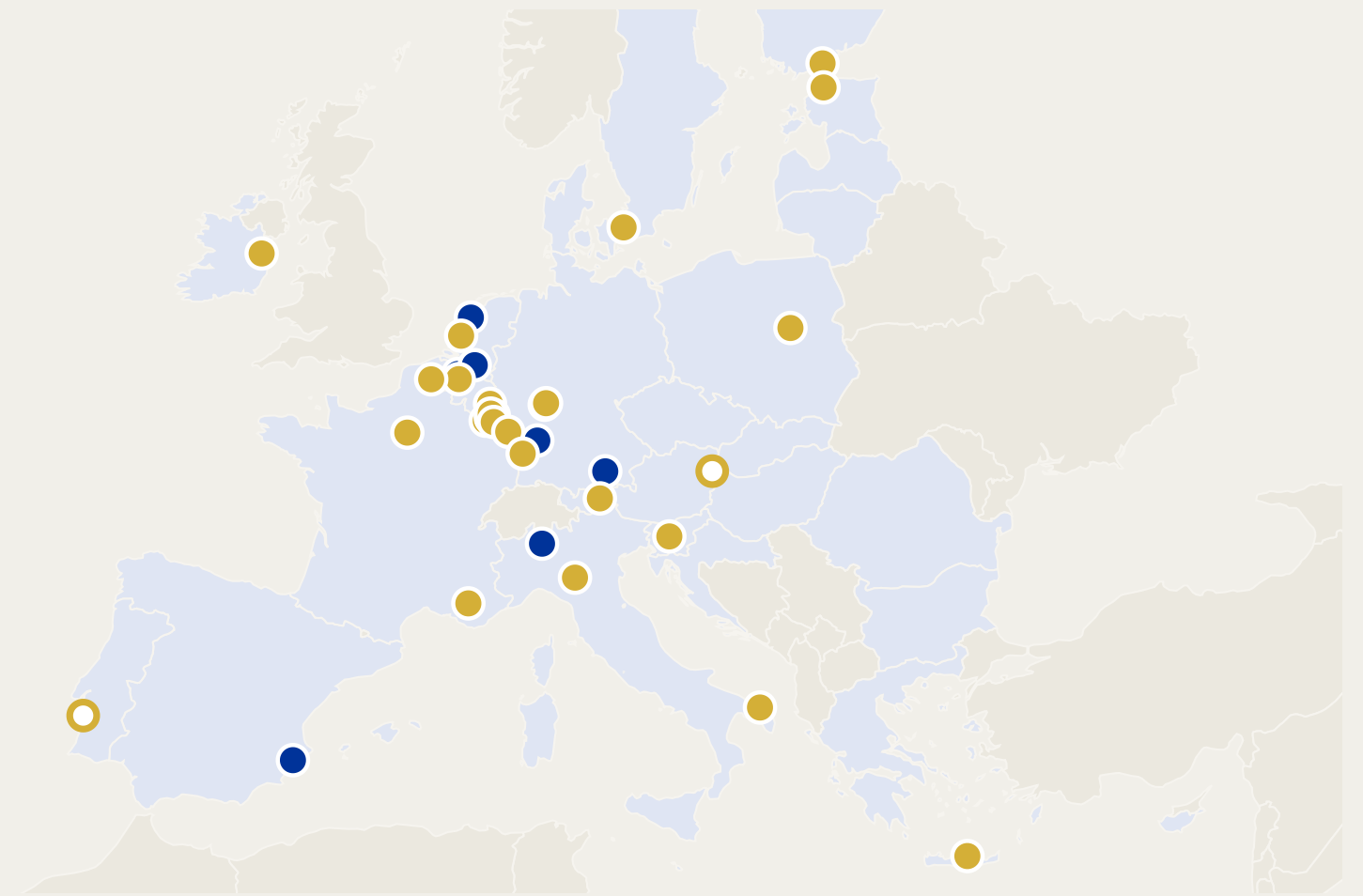
● European Schools
28 931 pupils

26

● Accredited European
Schools
17 083 pupils · 2 in
accreditation

46 014 pupils in total**2 614**

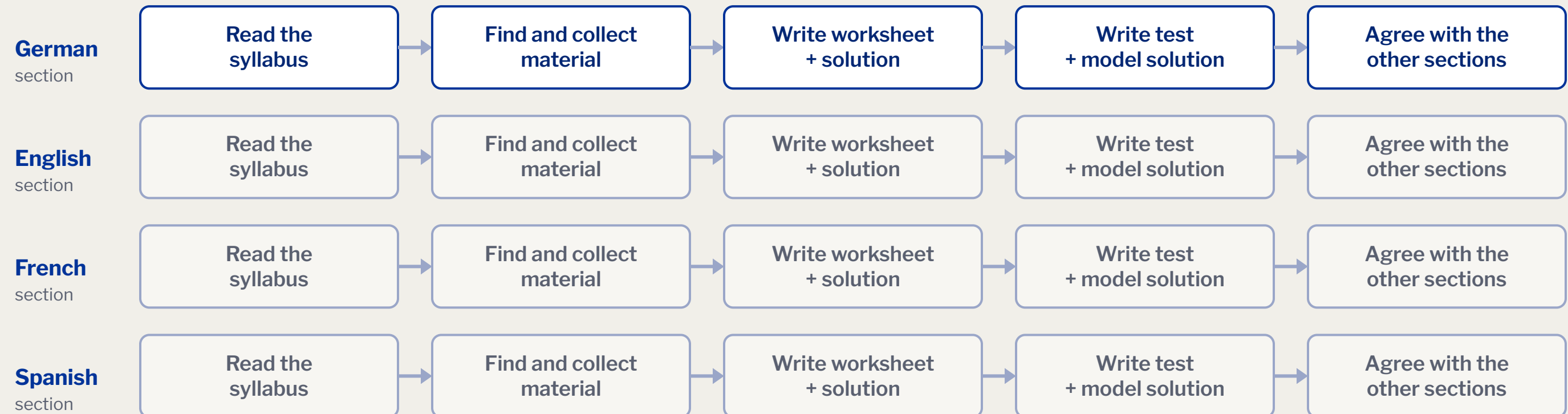
teachers in the 13 European
Schools
full-time equivalent · 1 641 of
them in secondary



Same objectives, rebuilt by every teacher, in every section: work that never reaches a pupil.

TEACHERS' WORK TODAY

One objective, built again in every section

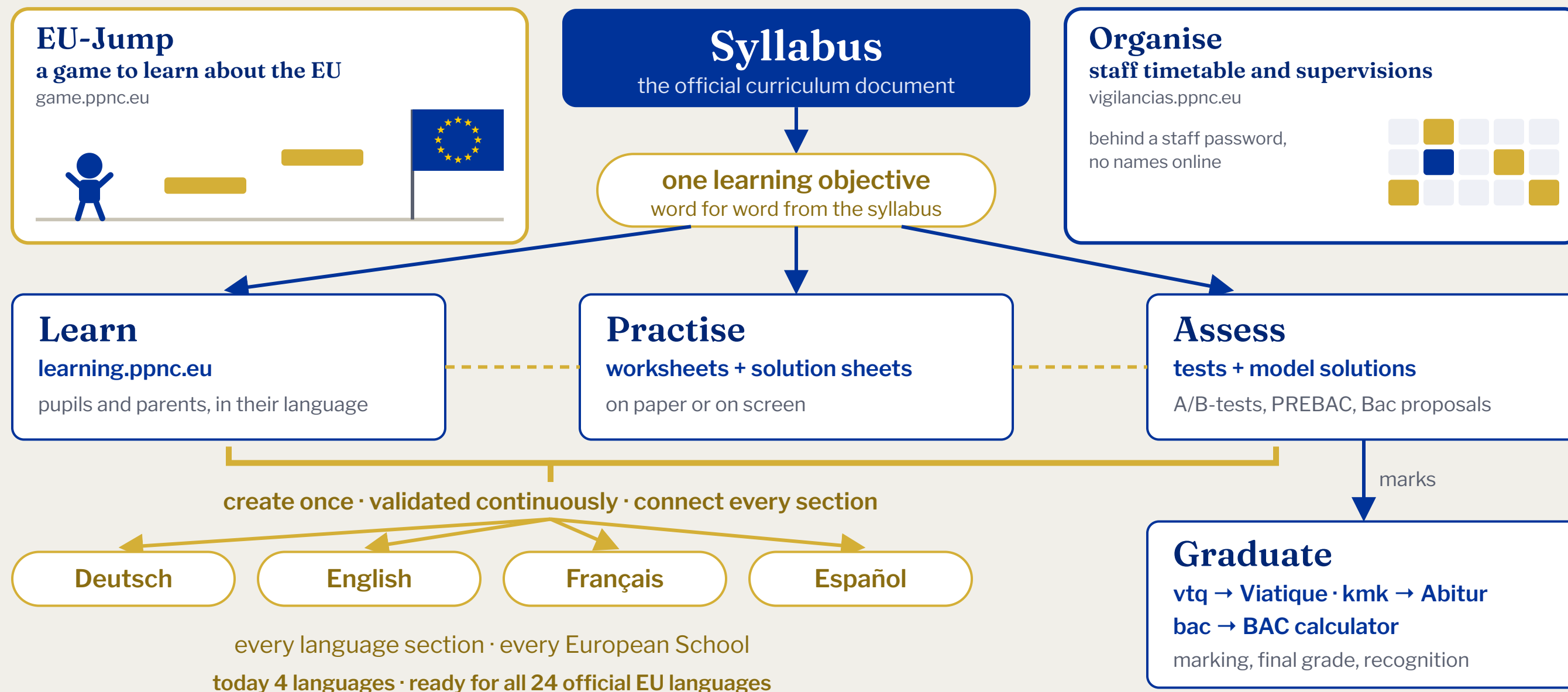


× 39 schools

Four teachers, the same five steps, in one school.

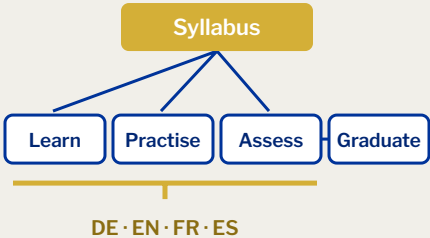
VISION

Everything from one syllabus, for every language



HOW IT IS BUILT

Not a chat window: AI guided by a European Schools knowledge base



	A CHAT (E.G. CHATGPT)	THIS SYSTEM
Source	whatever the model remembers	the official syllabus, objective word for word
Validation	none: errors reach the class	304 validation rules today (about 100 in August), applied to every change, continuously
Languages	one at a time, each a little different	the same page in every language (today DE · EN · FR · ES), formulas identical
Mistakes	the same mistake again tomorrow	every mistake found once becomes a new, permanent rule
Result	a one-off text for one teacher	a shared library for every section and school

The teacher still decides. The rules validate form and consistency, not full subject correctness; today there is one subject reviewer, me.

HOW IT IS BUILT · WHAT THE VALIDATION DOES

Five of the 304 validation rules, and what they catch

Same formula in every language

catches: A translation that changed or lost a formula, or a page left untranslated

Answer not given away

catches: A multiple-choice option that already reveals the solution

Tied to the syllabus

catches: A page without its official syllabus version and learning objective

Works on every device

catches: Overlapping labels or cut-off text, tested in every language on large and small screens

No outside servers

catches: Any request to another server, any cookie

Designed by a teacher, built with AI, still growing

The teacher decides what is validated. Every rule is tested itself, and new ones are added from feedback.

The knowledge base keeps growing: 101 rules on 3 Aug · 150 on 4 Sep · 191 on 23 Sep · 297 on 5 Oct · **304 on 7 Oct**

HOW IT IS BUILT · LEARNING SCIENCE

Every design choice has a reason, and a source

Support that fades

Worked examples for beginners, fewer hints as pupils advance.

Kalyuga, Ayres, Chandler & Sweller 2003

Mixed, spaced practice

Short sheets over time, mixed tasks instead of blocks.

Rohrer & Taylor 2006 · Rohrer et al. 2020

Several representations

Graph, table and formula, linked on purpose.

Ainsworth 2006

Fair tests, quick to mark

Clear multiple choice, analytic marking schemes.

Haladyna et al. 2002 · Jonsson & Svingby 2007

Each sheet names the reason for its design. Where research is thin, it says so.

DATA PROTECTION

Built to know as little as possible about pupils

No accounts

No login, no registration. Pupils simply open the page.

No pupil names

No names, no profiles, no tracking. Learning progress stays only in the browser on the pupil's own device.

No third parties

Fonts, videos and scripts come from our own server. No analytics, no advertising.

Hosted in the EU

Server in Germany, encrypted connections only.

Data minimisation and privacy by design, as the GDPR asks (Art. 5 and 25).

RESPONSIBLE AI · BUILT IN FROM THE START

AI helps the teacher. It never replaces the teacher.

The teacher decides

AI drafts. A teacher reviews every page and releases it by hand. Nothing goes live automatically.

No AI in pupils' tools

Pupils open plain web pages. They work without any AI, and no pupil ever talks to a chatbot.

No personal data

Names of pupils and colleagues never reach an AI.

Internal stays out

Exam papers from the internal system and pupils' work are never given to an AI.

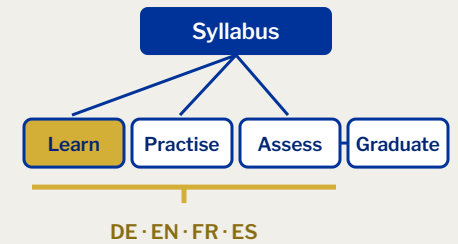
Open and traceable

The portal is labelled "AI-assisted", and a teacher checks every page. Every change is recorded with who made it.

European first

The open-source EuroLLM runs locally, hosting is in Germany.

Same page, four languages, one click



learning.ppnc.eu

12 courses · 178 learning pages · maths and physics,
S4–S7

EN

FR

ES

DE

The explanation in the first language, one click
away.

free

no login

no pupil data

any device

Live: [learning.ppnc.eu ↗](https://learning.ppnc.eu)

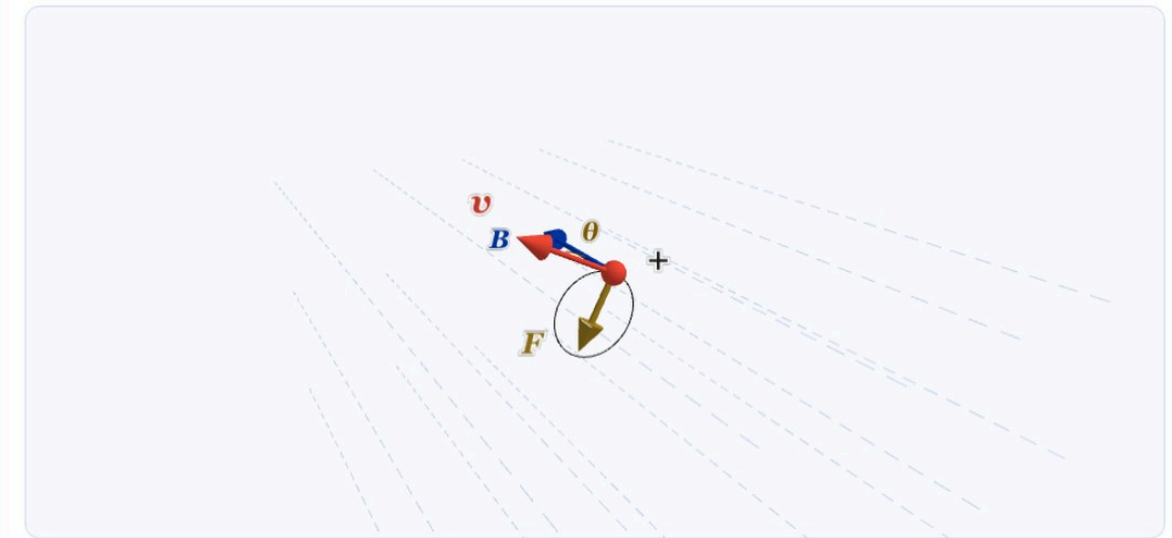
Magnetic field

PHYSICS · S7 · PHY · LEARN

EXPLORE

Explore: $\vec{F} = q \vec{v} \times \vec{B}$ in space

A particle moves with velocity v through a uniform magnetic field ($B = 0.10$ T). **Commit first** to where the force points — then the scene shows it. Rotate the scene to see all three directions.



Pause Perspective Front Top Reset view

Drag to rotate · wheel or two fingers to zoom · arrow keys on the stage

S7 physics · magnetic field · the force on a moving charge, in 3D

TEACHERS' TIME

Worksheets: straight from the syllabus, one template

One objective · one sheet · one solution sheet.

SHEETS WITH SOLUTION, PER WEEK

by hand, one teacher

■ 2–5

with the checked AI chain (weeks 38–40, 2026)

■ ≈ 40

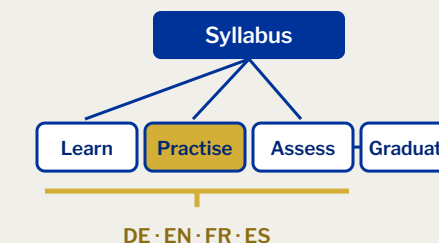
Since 22 August: **152** sheets, each with its solution sheet. Each one machine-validated; a teacher reviews it before it reaches pupils.

Live: **one worksheet in all 24 EU languages ↗**



Translated with EuroLLM

the open European language model, EU-funded, built for all 24 official EU languages. It runs on our own computer: no text goes to an outside service.



Name: _____ Datum: _____

S4 PHY · 1.3 Elektrische Energie zu Hause

Übung 1: Energiestromstärke

Handwerkszeug: siehe Theorie 1 dieses Blocks, Kästen „Die Energiestromstärke“ und „Watt, Kilowatt, Kilowattstunde“.

Aufgabe 1 — Dieselbe Gleichung, drei Richtungen

Die Energiestromstärke (Leistung) verbindet Energie und Zeit. Jede Teilaufgabe fragt nach einer anderen Größe.

- Ein Gasherd setzt in 250 s die Energie 475 000 J um. **Berechne** seine Energiestromstärke.
- Eine Radfahlerin tritt 2400 s lang mit einer Energiestromstärke von 135 W. **Berechne** die Energie, die sie dabei umsetzt.
- Das Wachs eines Teelichts enthält 489 600 J Energie; die Flamme setzt 34 W um. **Berechne**, wie lange das Teelicht brennt — in Sekunden und in Stunden.
- Die Gasheizung eines Hauses läuft an einem Wintertag 9 h lang mit 11 kW. **Berechne** die Energie in kW h und **rechne** sie in Joule um.

Aufgabe 1 a) bis c)

S4 physics · energy flow rate · German section

WHAT IT BRINGS

What pupils and teachers gain

For pupils

Learning at their own pace

Instant feedback, practice whenever they need it

The same high-quality materials

Consistent across sections, in their own language

Language learning in every subject

The same page in the working language and in their own

For teachers

More time for individual support

Instead of talking to the whole class: more feedback, larger learning gains

Routine work largely automated

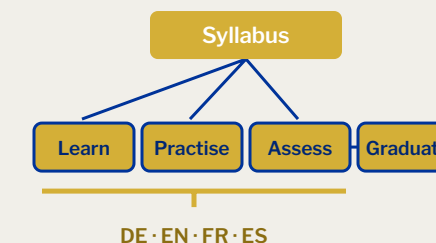
Worksheets, solution sheets, test versions for every section

Less work without value for pupils

Searching, reformatting, translating, coordinating

EFFICIENCY

Estimated: three hours saved per teacher per week



HOURS SAVED PER MATHS OR PHYSICS TEACHER PER WEEK

cautious $\approx 1\frac{1}{2}$ hcentral ≈ 3 hhigh $\approx 4\frac{1}{2}$ h

Not exact, but checkable.

In a pilot year, teachers keep a short time log, before and with the shared materials.

≈ 100 h

per teacher and school year
2.86 h $\times$ 36 school weeks

$\approx 170\,000$ h

per school year, across the 1 641 full-time secondary teaching posts of the 13 European Schools
extrapolation: same saving in every subject

≈ 100

full-time teaching posts, every year, on work done again and again
170 000 h $\div$ about 1 700 working hours per post

WHAT THREE HOURS A WEEK MEAN

Less workload, less stress

Time for individual support

Time for creative projects

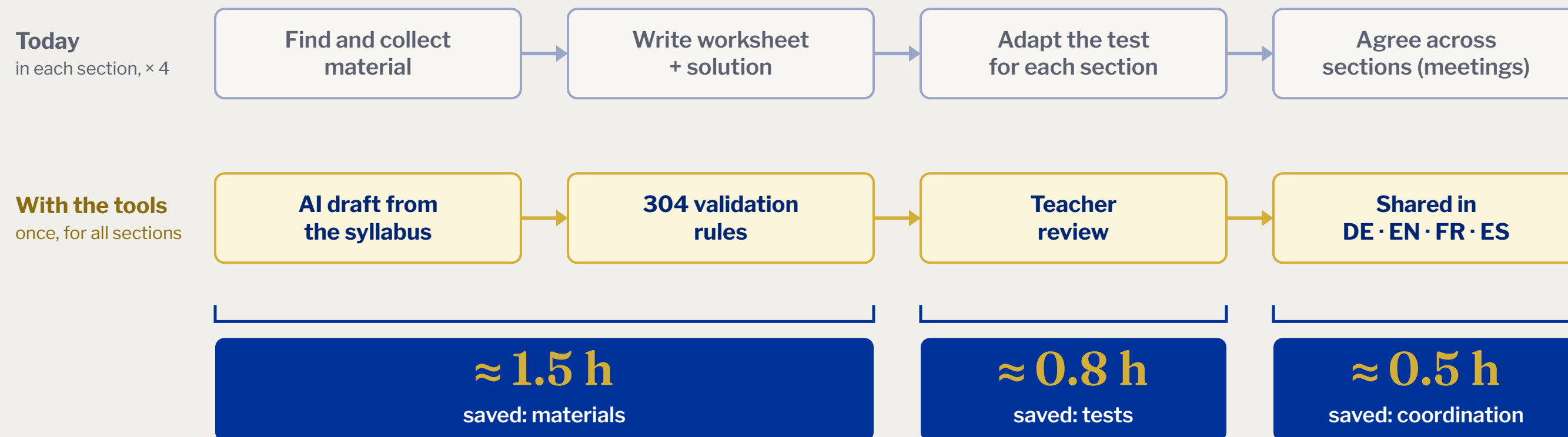
Time to work with colleagues from other sections

Room for what falls off the agenda today

Anchors: planning 6.8 h/week (OECD TALIS 2018) $\cdot$ -31 % preparation time with AI alone (EEF trial 2024, 259 teachers). Assumptions (teacher practice): 40–50 % of preparation is materials; 4 tests $\times$ 3 further sections $\times$ 1–4 h; coordination between sections 0.25–1 h/week; 36 school weeks.

WHAT IT SAVES · STEP BY STEP

Where the three hours come from



Together ≈ 2.9 hours per teacher per week

central estimate · rounded: about 3 hours · the middle bar of the previous slide

VISION

Every pupil their own path to the same objectives

Paths for different learners

Several routes to one objective: more visual, more practice, more challenge, extra language support.

A suggested next step

The page suggests what to do next from the pupil's own answers, worked out on the pupil's device, with no data on a server.

Practice that adapts

Self-checks that give more of what is still hard, and less of what already sits.

Feedback that improves it

Pupils and teachers report from any page; each report becomes a fix and, where possible, a new check.

The foundation is there, and it already reaches beyond maths and physics: first pilots with colleagues in **history** and **English**. Next: a growing team, more subjects, a pilot year.

Pilots: learning.ppnc.eu/kollegen ↗

YOUR TURN

Try it yourself



learning.ppnc.eu

Learning paths in maths and physics, S4–S7, in four languages.

Pick a course, switch the language, try a learning path and its exercises.

Free, no login, no pupil data, on any device.

learning.ppnc.eu ↗

WHAT IT IS ALL FOR

More time for what matters most:

the pupils.

Mark Popenco · Mathematics & Physics · European School Alicante

learning.ppnc.eu

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APPENDIX

More tools to try later

One worksheet, 24 languages	The same worksheet in every official EU language, translated locally with EuroLLM.
kuk.ppnc.eu	Interactive model solutions of tests, in four languages. Staff login.
bac.ppnc.eu	How subject choice and marks make the final Bac grade, for pupils and parents.
learning.ppnc.eu/kollegen	First pilots with colleagues: history (S5, the Industrial Revolution) and English (S6, five lenses for novels).
vtq.ppnc.eu	Turns a teacher's marking grid (direct, Excel or Word) into a Viatique file.
kmk.ppnc.eu	Converts Bac results into a German Abitur grade (KMK rules); runs only in the browser.
vigilancias.ppnc.eu	Staff timetable and exam supervisions. Staff password.
game.ppnc.eu	EU-Jump: a small game about the 27 EU countries.
info.ppnc.eu	Everything in one place: presentations, project brief, technical overview, contact.