

Knovel for Project-Based Learning

Empowering students to design, analyse, and innovate with trusted engineering intelligence



The project: Designing a bicycle

- Design a lightweight, durable, and sustainable bicycle.
- Research across materials, manufacturing, mechanics, safety and cost.
- Justify engineering decisions using technical data.
- Knovel supports every stage of the engineering design workflow.

Why project-based learning needs Knovel

- Move beyond theory into practical engineering problem-solving.
- Access engineering handbooks, standards, material properties, and equations.
- Support multidisciplinary collaboration.
- Encourage data-driven decision-making and critical thinking.



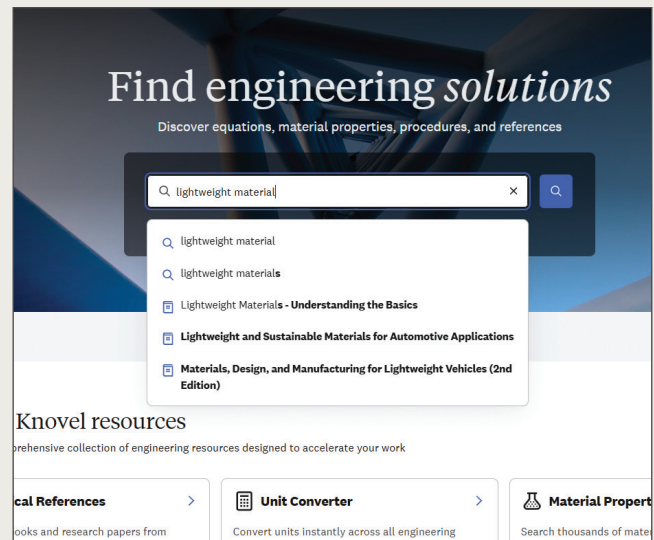
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Advancing human progress together

1. Research with a quick search

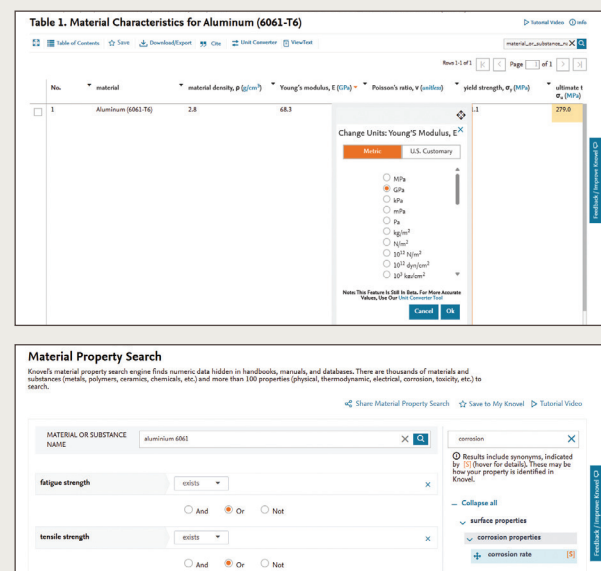
Students begin with natural language search queries such as:

- ‘Best lightweight material for a bicycle frame’.
- Explore manufacturing methods like welding, hydroforming, tube bending, and composite fabrication.
- Auto-suggestions introduce students to industry terminology and related engineering concepts.



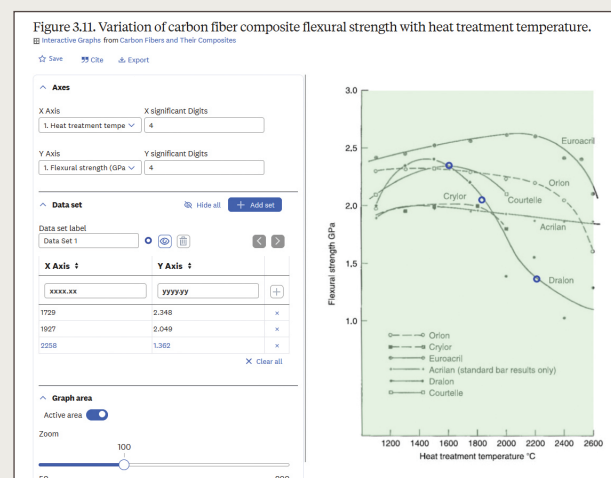
2. Material selection with property search

- Compare Aluminum 6061, Chromoly Steel, Titanium, and Carbon Fiber.
- Evaluate tensile strength, fatigue resistance, density, corrosion and resistance.
- Use interactive graphs and tables to analyze trade-offs.
- Students make evidence-based material selection decisions.



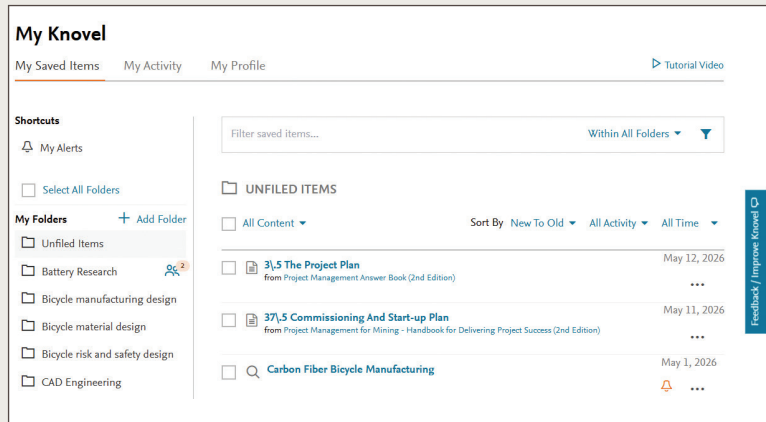
3. Engineering calculations and validations

- Use Kovel Interactive Equations and Graphs for stress analysis and load calculations.
- Validate frame strength, rider load capacity, and fatigue performance.
- Apply equations and extracted data directly from trusted engineering references.
- Export calculations into reports and presentations.



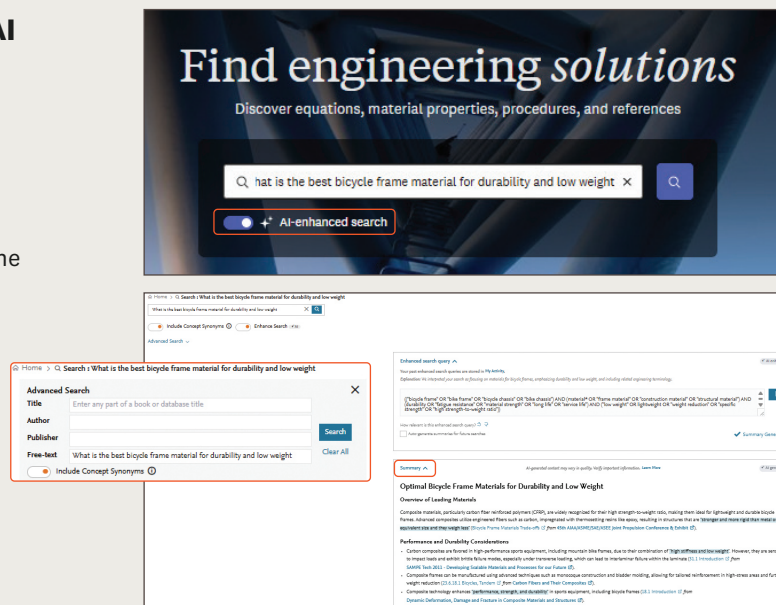
4. Collaborate with my Knovel

- Save searches, references, and material comparisons.
- Create shared folders for group collaboration and instructor review.
- Export citations for project reports and capstone documentation.



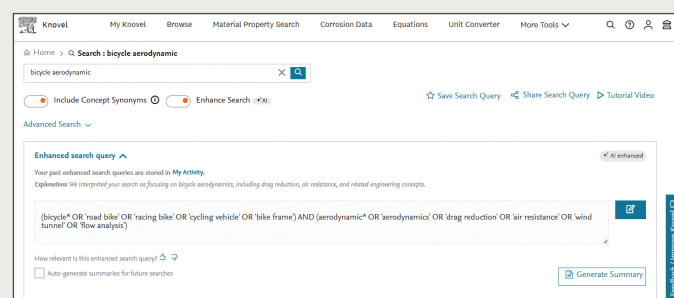
5. Accelerate discovery with Knovel AI

- Students ask engineering questions in plain language.
- AI generates concise summaries from trusted Knovel content.
- Example prompt: 'What is the best bicycle frame material for durability and low weight?'
- All AI answers include citations and links to source content.



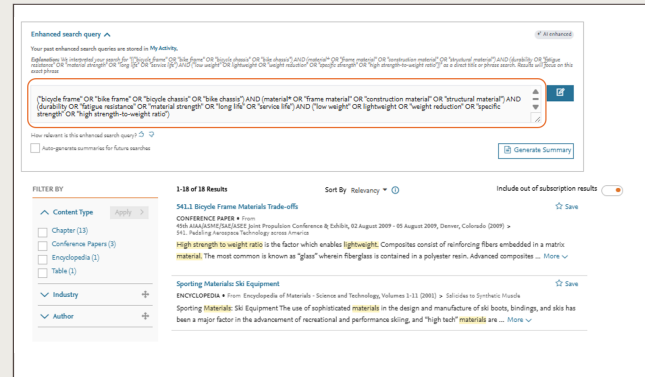
6. Expand search with Search Expander

- Search Expander uncovers related engineering concepts automatically.
- Students discover topics like fatigue analysis, vibration damping, aerodynamics, and sustainability.
- Promotes deeper exploration and innovation.
- Supports interdisciplinary project learning.



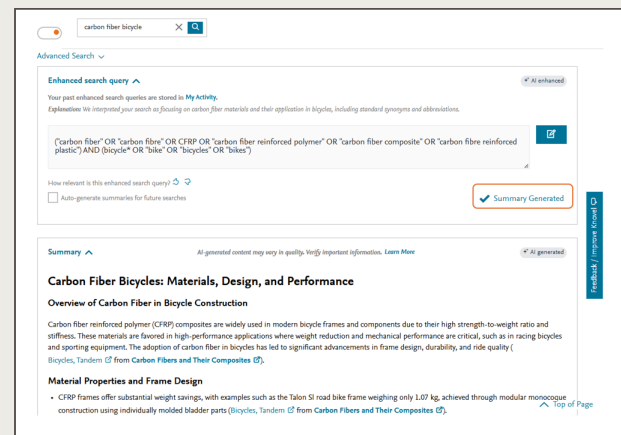
7. Build advanced research skills with a Boolean search

- Students learn professional engineering research techniques.
- Example: (bicycle OR bike) AND (frame OR chassis) AND (aluminium OR titanium).
- Use NOT operators to refine irrelevant results.
- Improves precision and efficiency in technical discovery.



8. On-demand summarisation saves time

- Helps students understand manufacturing standards and safety requirements faster.
- Supports design reviews and collaborative decision-making.
- Allows students to focus more on innovation and analysis.



Why students should use Knovel for project-based learning



Trusted content

Authoritative engineering handbooks, standards and data from leading publishers.



Evidence-based decisions

Make confident engineering decisions backed by reliable data and validated calculations.



Time efficiency

Find, analyse, and understand complex engineering information faster.



Skills for the future

Build research analysis and critical thinking skills that prepare you for your career.