

Dimensional Analysis Software for Students

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Introduction

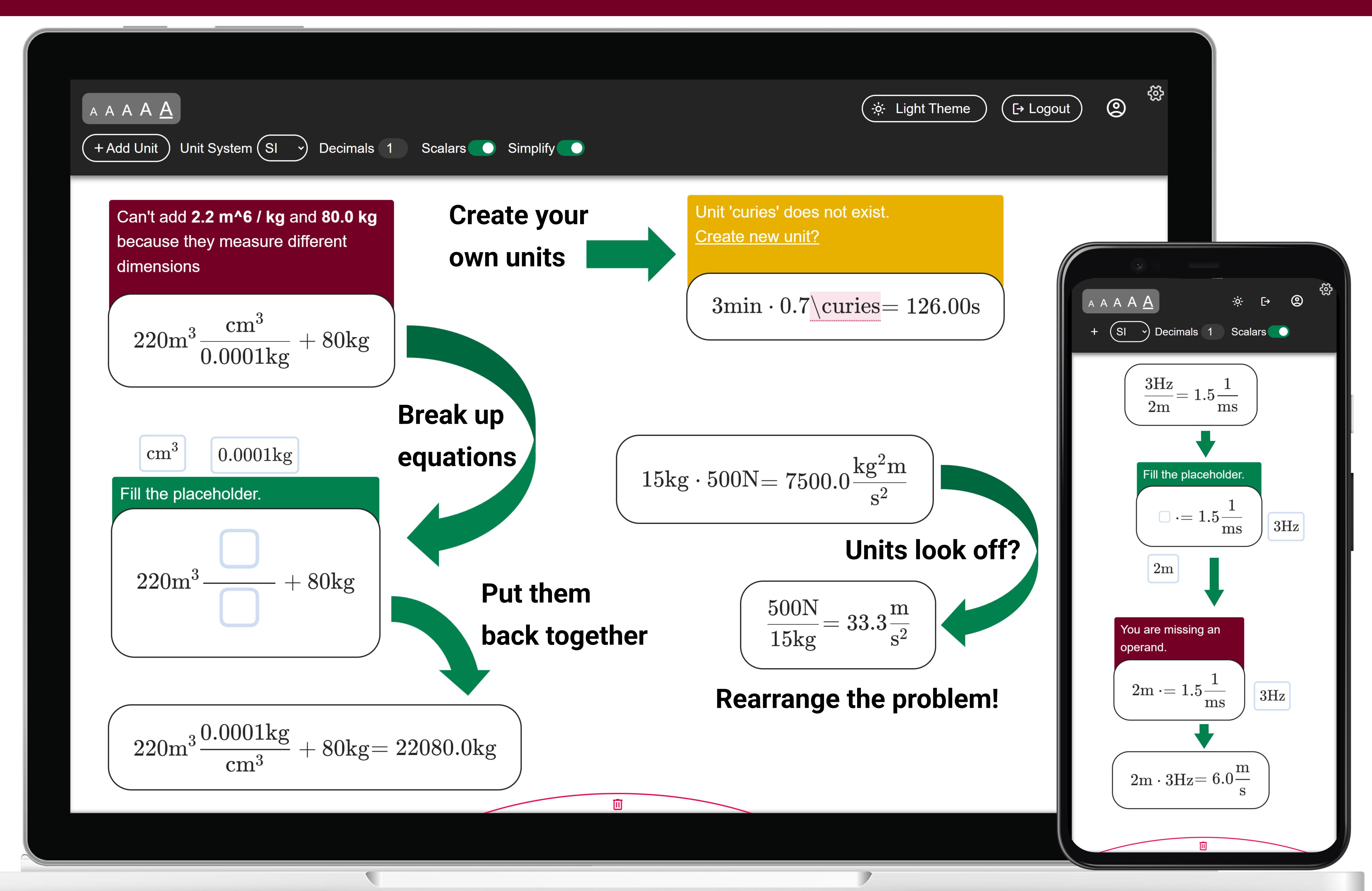
Units of measurement give numbers a meaning. Ignoring units until the end of the problem-solving process is tempting, but takes away from a student's understanding of their field and can lead to catastrophic mistakes [1]. Although students are expected to use and understand units, they are not emphasized in curriculums in an engaging way [2, 3]. In this project, we developed an interactive website, unitplayground.com, that focuses on units and their relationships to one another.

Methodology

- Research similar tools and note their shortcomings
- Consult professors to plan app features
- Choose development tools including a JavaScript framework, a math-rendering library, and unit-computation engines
- Integrate tools and develop custom algorithms and functionality
- Add persistent storage and authentication
- Make public at unitplayground.com

References

- [1] Oberg, James. "Why the Mars probe went off course [accident investigation]." IEEE Spectrum 36.12 (1999): 34-39.
- [2] Lenz, MacKenzie, and Elizabeth Gire. "Faculty views of and expectations for dimensional analysis." Physics Education Research Conference Proceedings. 2016.
- [3] Schmidt, Shelly J. "Development and use of visual explanations: Harnessing the power of the "seeing" brain to enhance student learning." Journal of food science education 8.3 (2009): 68-72.



Results

UnitPlayground delivers flexibility, interactivity, and accessibility through a variety of features.

Equations are calculated on the spot and produce instant feedback

Equations can be taken apart and put back together through a "drag and drop" interface

Unit not defined?
No problem,
create your own!

UnitPlayground detects errors it displays supportive hints to users

Accessible online for free