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Align lessons using our Learning Goals

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Build an Atom



Download 1,970 kB

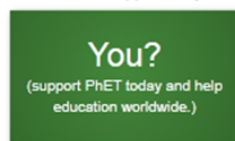
Run Now!

Embed

Version: 3.00 (change log)

Build an atom out of protons, neutrons, and electrons, and see how the element, charge, and mass change. Then play a game to test your ideas!

PhET is supported by



Thanks!

Search for Activities and Sims by Keyword

TEACHING RESOURCES

Main Topics

- Atomic Structure
- Atoms

Sample Learning Goals

- Use the number of protons, neutrons, and electrons to draw a model of the atom, identify the element, and determine the mass and charge.
- Predict how addition or subtraction of a proton, neutron, or electron will change the element, the charge, and the mass.
- Use the element name, mass, and charge to determine the number of protons, neutrons, and electrons.
- Define proton, neutron, electron, atom, and ion.

Tips for Teachers

The [teacher's guide](#) (pdf) contains tips created by the PhET team.

Teaching Ideas

Title	Authors	Level	Type	Updated
Structure of the Atom ★	Jackie Esler	MS	Lab	7/30/11
Build an Atom - Inquiry-based basics	Patricia Loeblein, Kathy	HS	Demo	6/18/11

See Below

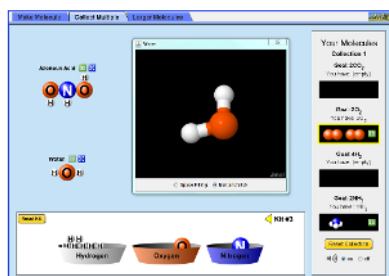
[Translated Versions >>](#)
[Software Requirements >>](#)
[Credits >>](#)

Find this sim in other languages

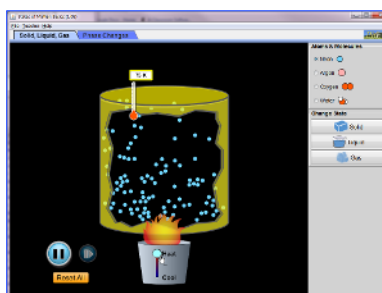
Gold Star activities are aligned with Inquiry Research

Featured Chemistry Sims

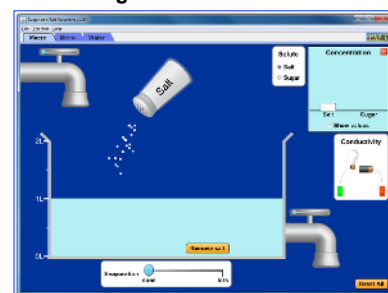
Build a Molecule



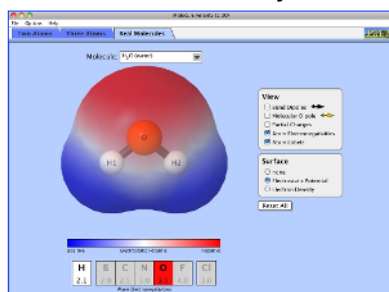
States of Matter



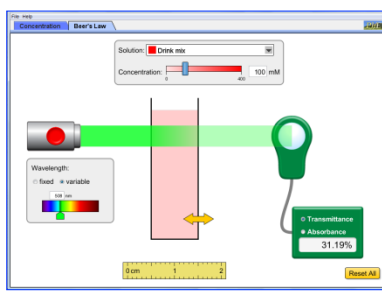
Sugar & Salt Solutions



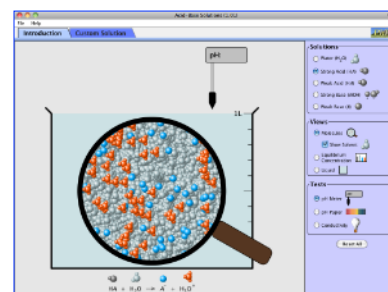
Molecule Polarity



Beer's Law Lab



Acid & Base Solutions





PhET Interactive Simulations

University of Colorado at Boulder
<http://phet.colorado.edu>

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What is PhET?

- Over 110 interactive, animated simulations for teaching and learning science and math
- Focus on physics and chemistry. Expanding into math, biology, earth science.
- Designed for middle school, high school, and college levels.
- Research-based and research-validated.
- Free. Web-based. Run online or download. Multiple languages.

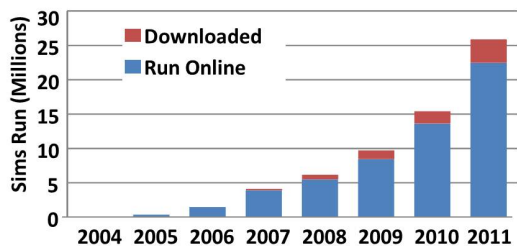
Goals

- Engage students in **scientist-like inquiry**
- Develop and use **expert visual and conceptual models** of the underlying physical principles
- **Coordinate across representations**, abstract concepts, mathematical models and real-world contexts
- Connect science principles to **everyday life** experiences
- Empower students to **see science as accessible** and understandable.
- Achieve **widespread adoption**

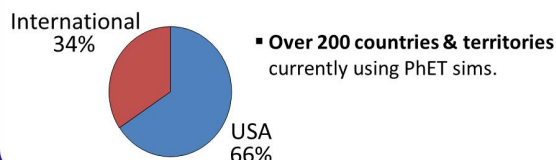
Expanding US and International Use

- over 25 million sims run online per year
- K-12 schools in every state, and over 900 different US colleges and universities
- Translations into over 68 different languages
- 3535 translated sims

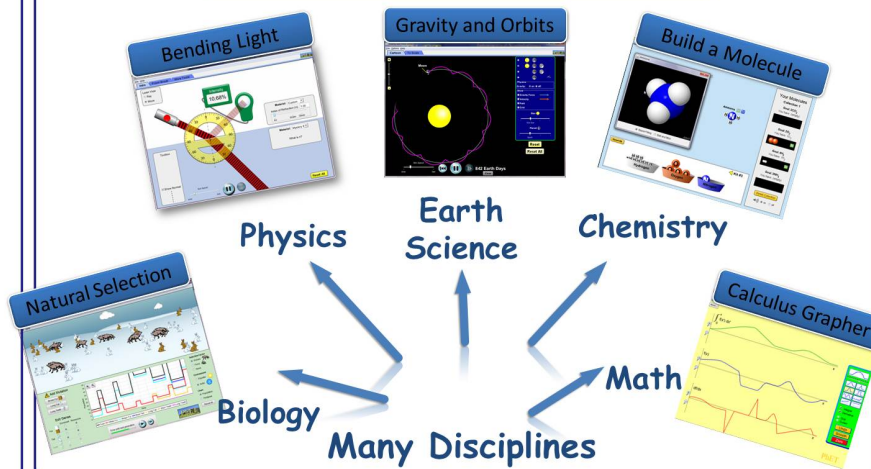
PhET sims run from website 2004-2011



International Use:



PhET Sample Sims

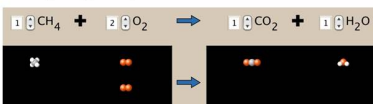


Using PhET Sims

Help your students think like science experts.

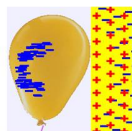
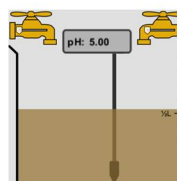
Pre-class homework:

Before the next class, play the balancing chemical equations game. Can you get a perfect score.



Lecture:

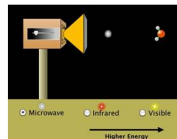
Concept tests: Will adding water to the beaker cause pH to increase, decrease, or stay the same?



Demos: Write why you think the balloon sticks on the wall.

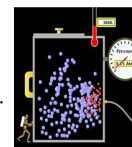
Discussion:

Based on the effect that photons of different energies have on various molecules, how does a microwave oven work?



Lab:

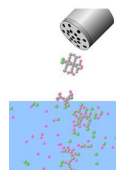
Qualitative: Design experiments to find all the variables that affect pressure.



Quantitative: How many times as fast are the air molecules in this room moving compared to a car going 50 mph? Give evidence to support your ideas.

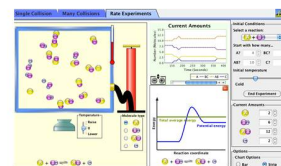
Recitation:

Visualize ions in solution and compare the solubility of different salts.



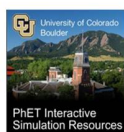
Post-class homework:

Run experiments using the *Many Collisions* tab to determine what contributes to a successful reaction, and what affects the speed of the reaction.



Webinar & Podcast

Introduce teachers new to PhET with our free archived webinar or our Podcast on iTunes. Find the links at
<https://phet.colorado.edu/newsletters/2011-november/newsletter.html>



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Funding

The PhET Project is made possible through the support of:
The William and Flora Hewlett Foundation, The National Science Foundation, The O'Donnell Foundation, The University of Colorado at Boulder, C. Wieman & S. Gilbert, others,
and your donations...

Gifts as small as \$10, \$20, or \$50 help develop, maintain and support our sims. Visit <http://phet.colorado.edu/en/donate> to help support PhET and our quest to improve learning.