



Virtual Science Labs

What are they and how can I use them in my classroom?

A little about me...

- Online teacher and science consultant for LEARN



What are virtual labs?

- Allows students to perform an investigation using the scientific method in an online environment

Why use virtual labs?

- Virtual labs can be used to augment or replace hands-on lab investigations if you:
 - have limited equipment , materials, chemicals.
 - have students who miss class often.
 - want more tech in your classroom.
 - want to enhance student learning.

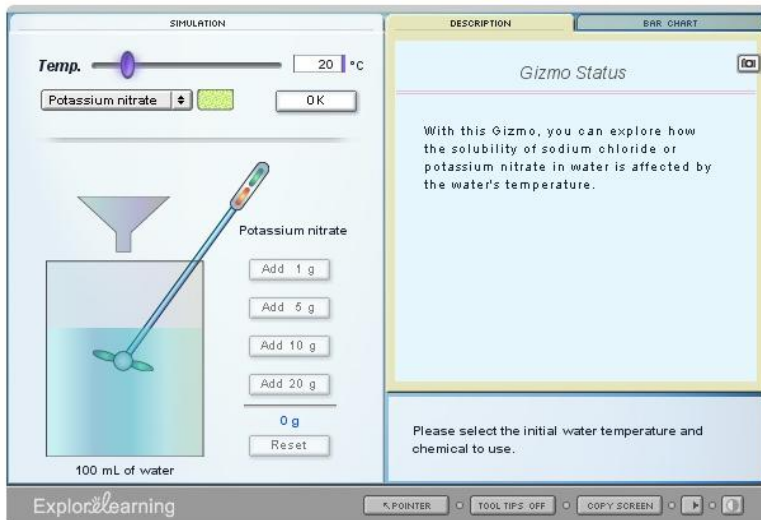
ExploreLearning

<https://www.explorelearning.com/>

- Simulations run on their website
- Free 30-day trial, but Quebec teachers have free access
- Teacher guides, student guides (with answers), and assessment questions available
- There is a [list of Gizmos](#) linked to the PoL & QEP

ExploreLearning

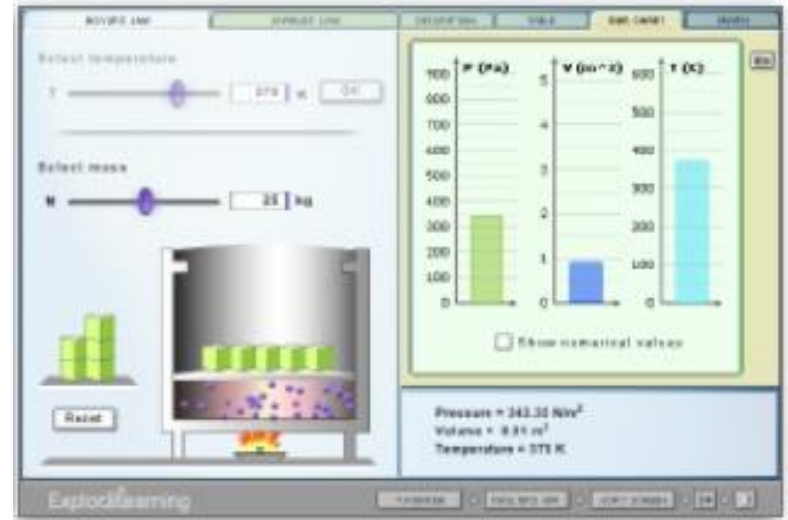
- Some of my favourites are:



Solubility and Temperature

Solubility

Sec Cycle 2, Year 2



Boyle's Law and Charles' Law

General gas law

Sec Cycle 2, Year 3 - Chemistry

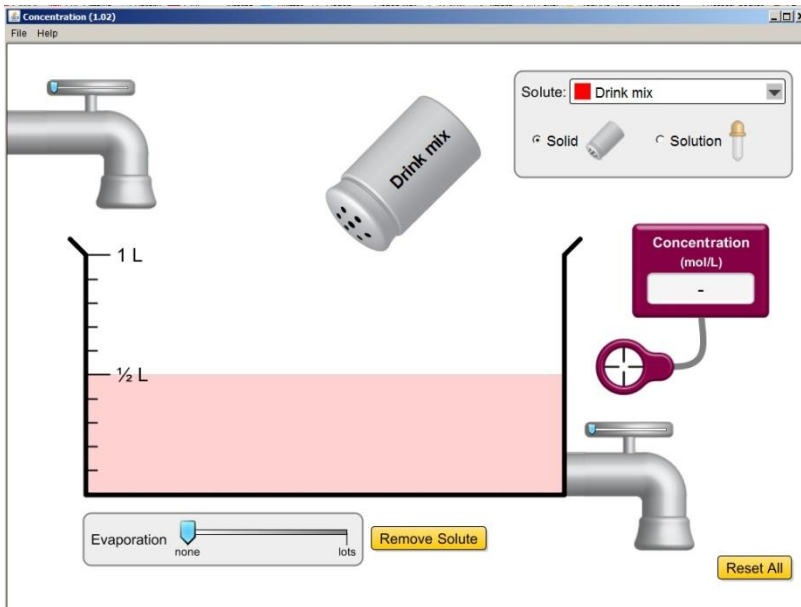
PhET Interactive Simulations

<http://phet.colorado.edu/>

- Simulations can be run on their website or downloaded
- Access is free
- Teacher guides available as well as space for teachers to share resources
- A few are available in French

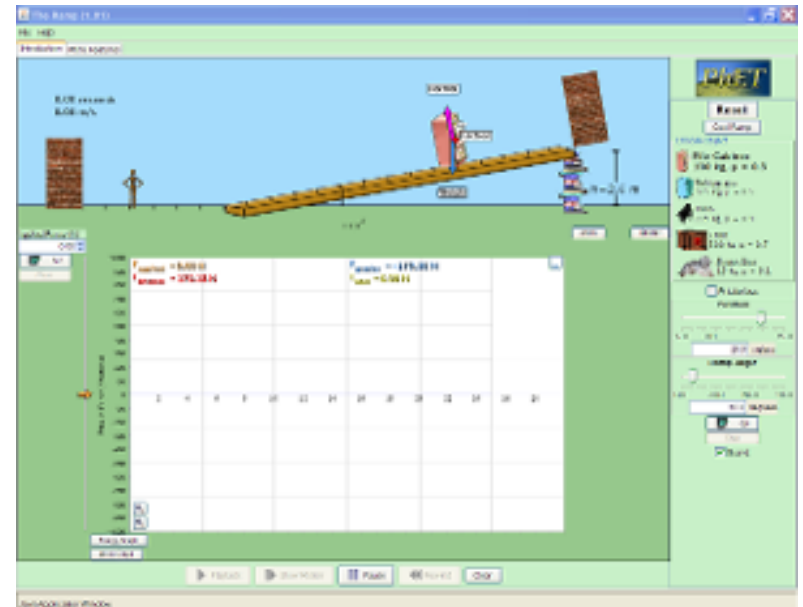
PhET Interactive Simulations

- Some of my favourites are:



Concentration

Sec Cycle 2, Year 1



The Ramp

Sec Cycle 2, Year 3 - Physics

ChemCollective

<http://www.chemcollective.org/>

- Simulations can be run on their website or downloaded
- Access is free
- Virtual labs, autograded problems, tutorials, scenario-based activities, visualizations, and simulations available
- Includes full virtual lab, where you can mix chemicals and measure pH, temperature, and concentrations

ChemCollective

IrYdium Chemistry Lab -- Default Virtual Lab

File Edit Tools View Help

Stockroom Explorer...

- IrYdium Solutions
 - Distilled H₂O
 - Stock Solutions
 - Strong-acids
 - Weak-acids
 - Conjugate-acids
 - Strong-bases
 - 1M NaOH
 - 0.1M NaOH
 - 3M NaOH
 - 10M NaOH
 - Weak-bases
 - Conjugate-bases
 - Indicators
 - Solids

Workbench 1

1M NaOH

600mL Beaker

Solution Info...

Name: 1M NaOH
Volume: 100.0 mL

Aqueous Solid Gas

log(Molarity)

Species	Molarity
H ⁺	1.010e-14
OH ⁻	1.000e0
Na ⁺	1.000e0

25.0°C

PH Meter

14.00

1M Sodium Hydroxide

Transfer amount (mL): Pour from to

ChemCollective

- Some of my favourites are:

The screenshot shows the IrYdium Chemistry Lab interface for a "Dilution Problem 1". The Stockroom Explorer on the left contains "Iridium Solutions", "Distilled H₂O", "1M C₆H₁₂O₆", and "Problem Description". The Workbench 1 area shows a 600mL Beaker and a 1M C₆H₁₂O₆ flask. The Solution Info panel on the right displays "Name: 600mL Beaker", "Volume: 100.0 mL", and "Aqueous" selected. A bar chart shows log Molarity for H⁺, OH⁻, and C₆H₁₂O₆. A table below the chart lists species and molarities:

Species	Molarity
H ⁺	1.005e-7
OH ⁻	1.005e-7
C ₆ H ₁₂ O ₆	5.000e-1

The temperature is 25.0°C and the pH meter shows 7.00. The bottom status bar indicates "Transfer amount (mL):" and "Pour from Distilled H₂O to 600mL Beaker".

Glucose Dilution Problem

The screenshot shows the IrYdium Chemistry Lab interface for a "Default Lab Setup". The Stockroom Explorer on the left contains "Iridium Solutions", "Distilled H₂O", "Coffee", "Milk", and "Problem Description". The Workbench 1 area shows a Coffee flask and a Milk foam cup. The Solution Info panel on the right displays "Name: Foam Cup", "Volume: 140.0 mL", and "Solid" selected. The temperature is 65.14°C and the pH meter shows 6.42. The bottom status bar indicates "Transfer amount (mL): 40" and "Pour from Milk to Foam Cup".

Coffee Problem

What about you?

- Do you have any other virtual science labs that you would like to share?

ANY QUESTIONS OR COMMENTS?

Thank you!

- Thanks so much for your time and attention.
- Feel free to contact me at kcule@learnquebec.ca or [@Science LEARN](#)