

**Sähköiset työvälineet lukion kemian
opinnoissa**

**Opettajan työkalut ja
lähestymistavat**

Ari Myllyviita

Kemian ja matematiikan lehtori

Opettajakouluttaja

Helsingin yliopiston Viikin normaalikoulu

Pohdiskelutehtävä

- Miten sähköiset työvälineet ovat muuttaneet opetusta, oppimista ja arviointia?
 - Millainen tilanne oli 5 vuotta sitten itsellä?
 - Millainen tilanne on NYT?
 - Millainen tilanne on 5 vuoden päästä?

Kemian opetuksen kokonaisuus

Pedagogiset työkalut

Mallintaminen
Simulointi
Visualisointi
Käsitteiden hallinta (kemian kieli)
Kokeellisuus
Tutkiva oppiminen

Kognitiiviset työkalut

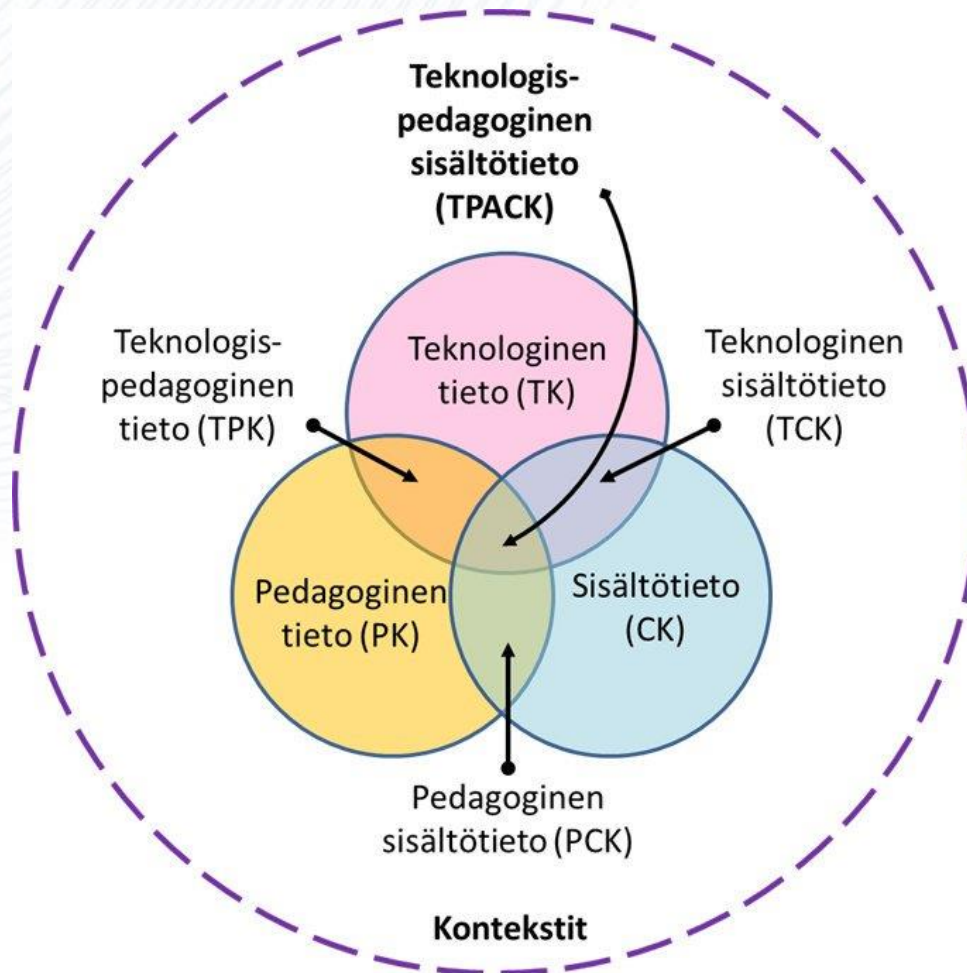
Opiskelun tukeminen (käsitekartat)
Dokumentointi (työselotukset, posterit)
Sähköiset oppimisympäristöt (alusta, ohjelmat)

Metakognitiiviset työkalut

Reflektointi (blogipedagogiikka) – mm. omien ajatustapojen tunnistaminen
Itsesäätely
Itsearviointi
Arviointi

Luonnontieteen luonne

Sähköisten työvälineiden käyttö on pedagoginen valinta



Technological Pedagogical Content Knowledge (TPACK)



What is TPACK?

TPACK is a framework that teachers can use to help them identify knowledge they might need to focus on to be able to teach effectively with technology.

It builds upon the work of Shulman's idea of Pedagogical Content Knowledge: http://en.wikipedia.org/wiki/Lee_Shulman.

Using their Venn diagram the aim is to equally apply the three separate areas of knowledge.

Technological Knowledge

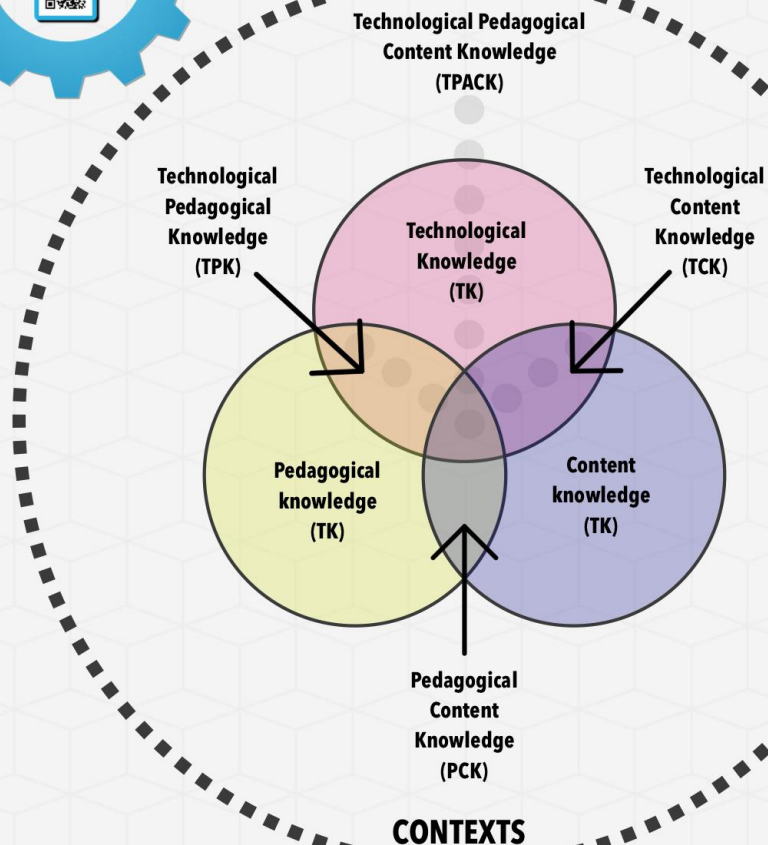
This is the knowledge and mastery of technology so that an educator can use & confidently plan use of technology in the classroom including when it is not required.

Pedagogical Knowledge

This is the knowledge and practice of teaching & learning that an educator can use such as classroom management, taxonomies, planning & assessment.

Content Knowledge

This is the knowledge of subject content such as concepts, theories, ideas, frameworks, evidence & proof and established practices including ways to develop such knowledge.



Pedagogical Content Knowledge

PCK links together the pedagogical and content knowledge to bring about learning that is built upon strong subject knowledge and teaching & learning strategies.

Technological Content Knowledge

TCK links together technology and content knowledge to bring about learning that is built upon strong subject knowledge and a mastery of "more than the subject they teach."*

Technological Pedagogical Knowledge

TPK is "an understanding of how teaching & learning can change when particular technologies are used in particular ways."*
Knowing a range of tools & their appropriateness within different strategies.

Technological Pedagogical Content Knowledge TPACK

This is truly meaningful, deeply skilled teaching with or without (because sometimes this can be the best choice) technology. It differs from three individual concepts because to embrace all three simultaneously requires a deep understanding of how all three can work together to bring about the best technologically and pedagogically sound learning based upon a deep understanding of subject matter.

An example of this might be a lesson plan based upon assessment (PK) which looks at the content matter (CK) which examines how technology (TK) could transform learning.

TPACK is truly meaningful, deeply skilled teaching with or without (because sometimes this can be the best choice) technology."

Developed from the TPACK model by Koehler & Mishra - Original found @ www.tpack.org

TPACK

TPACK (Mihra & Koehler, 2006)

- Emphasizes the importance of developing integrated and interdependent understanding of three primary forms of knowledge – technology, pedagogy, and content
- Aim is to move teachers beyond technocentric strategies that focus on technology rather than learning

Revised TPACK (Phillips, 2016)

- TPACK as an embodied phenomenon shaped by social, organizational, and cultural factors extending beyond individuals
- Emphasis on the socially mediated contexts in which teachers develop their TPACK
- Local Communities of Practice (CoP) and Workplace Learning important factors for examining and extending teachers' TPACK development

Esimerkkejä sähköisten työvälineiden käytöstä

- Mallintamisen työkalut
 - Molekyyylimallinnusohjelmat
 - ChemSenceAnimator, (gif)animaatio-ohjelmat
- Kognitiiviset työkalut: käsitekartat ja miellekartat
 - CmapTools
 - FreeMind
 - Esitysgrafiikka (PowerPoint, Prezi...)

Opettajien apuvälineitä – aineenhallinnan työkalut

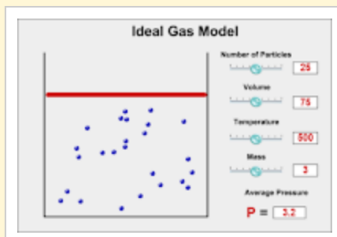
Virtuaalilaboratorioita yms.

Chemical Thinking Interactives

 Search this site

[Home](#)
[Submicro](#)
[Atomic Structure](#)
[Bonding](#)
[Molecular Structure](#)
[IMFs](#)
[Reactions](#)
[Thermodynamics](#)
[Kinetics](#)
[Comments](#)
[Contacts](#)

WELCOME!

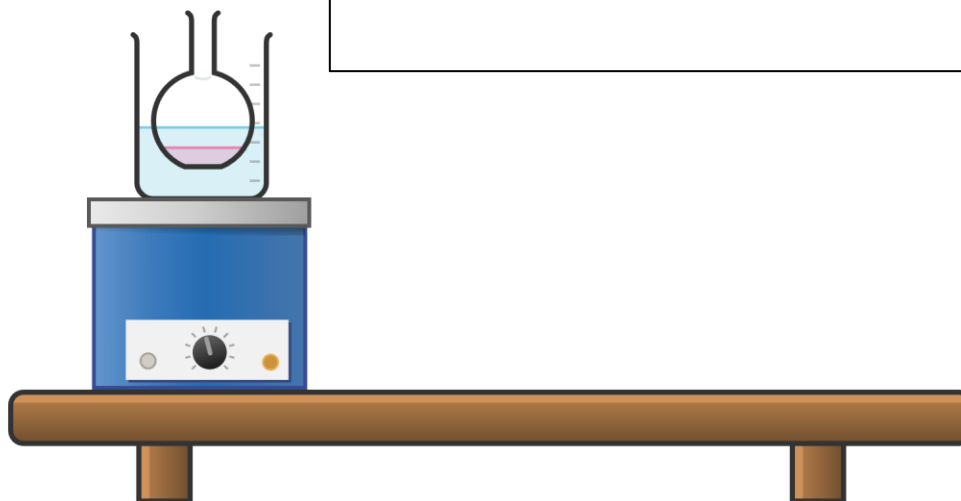
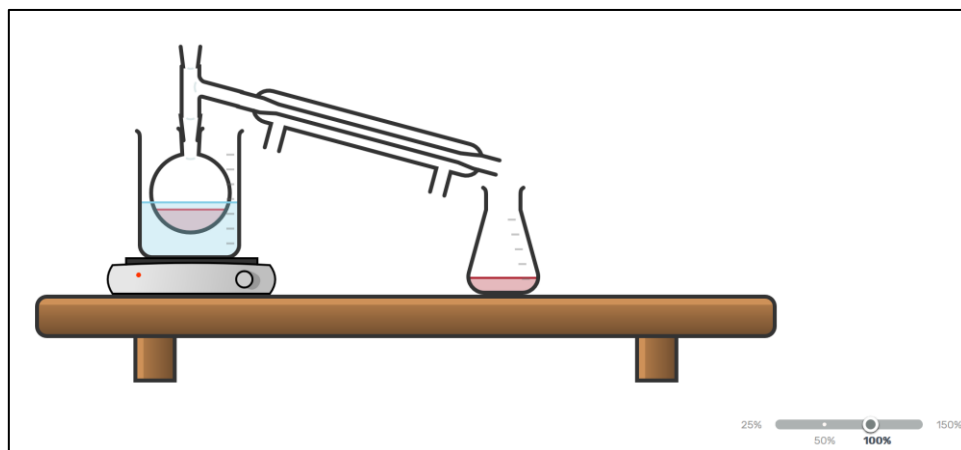


This website includes a set of interactive educational resources used to support teaching and learning in introductory chemistry courses, particularly in the **Chemical Thinking** curriculum. We include links to simulations developed in-house or by other educational groups (e.g., **KCVS**, **Molecular Workbench**, **PhET**) to more actively engage students in the analysis of the properties and behaviors of different chemical systems.

We are transitioning to include only simulations developed using HTML5 which are compatible with all types of browsers and devices. These resources have been classified based on the topic or concept that they help address. We use them in the classroom to have students generate data that they can analyze, identify patterns in the properties of a system, test hypothesis, and verify predictions. Your questions, comments, and suggestions are welcomed [here](#).

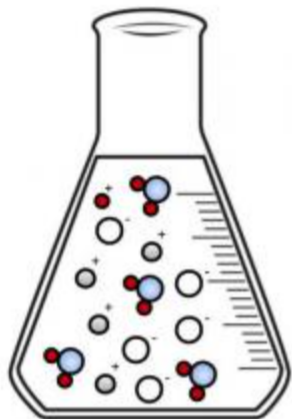
Search apparatus

- Chemistry
- Hot Plate
 - Magnetic Stirrer
 - Spirit Lamp
 - Bolling Tube 
 - Bolling Tube With Side Arm
 - Sand Bath
 - Heating Mantle
 - Stirring Rod
 - Magnetic Stir Bar
 - Glass Wool
 - Wire Gauze
 - Clay Triangle
 - Beaker/Crucible Tongs
 - Test Tube Holder Peg
 - Test Tube Holder (Metal)
- FILTERING
- Filter Funnel
 - Thistle Tube



DIY Particulate Models

Melissa Hemling | Mon, 03/09/2020 - 21:57



Particulate diagrams are all the rage in chemical education. The [new AP Chemistry CED](#) emphasizes particulate model use in **Science Practice 1: Models and Representations**. *Particulate models help students visualize the invisible sub-microscopic world of chemistry. This can help students understand and explain macroscopic phenomena.*

Many ChemEd X bloggers ([Meyers](#), [Gardner](#), and [Ragan](#)) have discussed their benefits.

Recently, ChemEd X blogger [Michael Farabaugh](#) discussed how he uses particulate diagrams to identify and address chemical misconceptions in AP Chemistry. While textbooks and resources are starting to contain more and more particulate representations, I often can't find the particulate model I want to use for a practice problem, in-class example, card sort, or assessment.

Creating your own particulate diagrams may seem daunting. In this blog post, I would like to share how I create professional-looking particulate diagrams using free tools. When I had to create models as a writer for the Flinn Chemistry POGIL book, I learned how to draw particulate diagrams in Google Slides and Powerpoint. These free programs give you maximum control over the location of objects to produce professional-looking results. I should mention that I teach at a Google school with 1:1 Chromebooks so my examples will use Google Slides, but the techniques are easily transferable to Microsoft Powerpoint.

Drawing lab equipment

I use [Chemix.org](#) to draw lab equipment. Chemix is a free online editor for drawing lab equipment and diagrams.

RESOURCES BY TOPIC

[Stoichiometry](#)
[Thermochemistry](#)
[Kinetics](#)
[Equilibrium](#)
[Acid-Base Chemistry](#)
[Solubility](#)
[Oxidation/Reduction and Electrochemistry](#)
[Analytical Chemistry/Lab Techniques](#)
[Physical Chemistry](#)
[Properties of Solutions](#)

RESOURCES BY TYPE

[Virtual Labs](#)
[Autograded Problems](#)
[Tutorials](#)
[Scenario-Based Activities](#)

RESOURCE TYPE: Virtual Labs

The Virtual Lab is an online simulation of a chemistry lab. It is designed to help students link chemical computations with authentic laboratory chemistry. The lab allows students to select from hundreds of standard reagents (aqueous) and manipulate them in a manner resembling a real lab. [More information and offline downloads.](#)

Please scroll below to find our collection of pre-written problems, they have been organized by concept and ranked by difficulty.

[> Stoichiometry](#)
[> Thermochemistry](#)
[> Equilibrium](#)
[▼ Acid-Base Chemistry](#)
[Strong Acids and Bases](#)

Strong Acid and Base Problems

Textbook-style strong acid and base problems that can be checked using the Virtual Lab.

[i Get Info](#)
[➔ Go](#)

Determination of the pH Scale by the Method of Successive Dilutions

Erilaisia tietokantoja ja aineistoa

Erilaisia opettajille sopivia työkaluja

- Liuosten valmistukseen (Merck):
 - Liuoksien laimentaminen:
<https://www.sigmaaldrich.com/chemistry/stockroom-reagents/learning-center/technical-library/molarity-calculator.html>
 - Kiinteä aine liuokseksi
<https://www.sigmaaldrich.com/chemistry/stockroom-reagents/learning-center/technical-library/mass-molarity-calculator.html>

Mass Molarity Calculator

Calculate Mass Required for Molar Solution

The mass molarity calculator tool calculates the mass of compound required to achieve a specific molar concentration and volume. To dilute a solution of known molarity, please use the [Solution Dilution Calculator](#). To dilute a solution of concentrated acid or base of known w/w% strength, please use the [Acid & Base Molarity Calculator](#).

Formula weight

 g/mol

Desired final volume

 milliliters (mL) ▾

Desired concentration

 molar (M) ▾

Calculate Mass

Mass= g

Print This Page

[Acid & Base Molarity Calculator](#)
[Mass Molarity Calculator](#)
[Solution Dilution Calculator](#)

Popular Tools

[Unit Converters](#)
[Pressure-Temperature Calculator for Solvents](#)
[Physical Properties of Solvents Table](#)
[Molarity Calculator](#)
[Solution Dilution Calculator](#)
[Mass Molarity Calculator](#)
[Structure Search](#)
[Glassware Center](#)
[SDS and CofA Search](#)
[Web Toolbox](#)
[Analytical Resources](#)
[Life Science Resources](#)

Normality & Molarity Calculator

Acid and Base Solution Preparation

The molarity calculator tool provides lab-ready directions describing how to prepare an acid or base solution of specified Molarity (M) or Normality (N) from a concentrated acid or base solution. To prepare a solution from a solid reagent, please use the [Mass Molarity Calculator](#). To dilute a solution of known molarity, please use the [Solution Dilution Calculator](#).

 Select acid or base:

Hydrochloric Acid ▾ HCl

Density:

1.2 g/mL

Formula weight:

36.46 g/mol

Weight percentage:

37.0 % w/w

Desired final volume:

500 mL

Desired concentration:

1 Molar ▾

Results based on your selection:

Your stock solution of **Hydrochloric Acid** is calculated to be **12.178 M** based on a density of **1.2 g/mL**, a formula weight of **36.46 g/mol**, and a concentration of **37% w/w**.

To make a **1 M** solution, slowly add **41.059 mL** of your stock solution to **125 mL** deionized water. Adjust the final volume of solution to **500 mL** with deionized water.

[View Hydrochloric Acid \(CAS# 7647-01-0\) Products](#)

Reset

Calculate

Print This Page

Popular Tools

[Unit Converters](#)

[Pressure-Temperature Calculator for Solvents](#)

[Physical Properties of Solvents Table](#)

[Molarity Calculator](#)

[Solution Dilution Calculator](#)

[Mass Molarity Calculator](#)

[Structure Search](#)

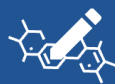
[Glassware Center](#)

[SDS and CofA Search](#)

[Web Toolbox](#)

Analytical Resources

Life Science Resources



Draw Structure



Upload ID List



Browse Data



Periodic Table

103M Compounds

253M Substances

268M Bioactivities

31M Literature

3M Patents

[See More Statistics >](#)

728 Data Sources

[Explore Data Sources >](#)

What is PubChem?

PubChem is the world's largest collection of freely accessible chemical information. Search chemicals by name, molecular formula, structure, and other identifiers. Find chemical and physical properties, biological activities, safety and toxicity information, patents, literature citations and more.

We are constantly adding new data and working on improving interfaces to chemical information. Please check back often!

Search Minerals By Chemistry

To use the chemical search form click on an element to select it (matches MUST INCLUDE this element.) It will turn yellow. Click again to mark it as excluded (matches MUST NOT INCLUDE it), it turns black. Noble gasses and elements not found in nature are excluded. When finished hit one of the search buttons. If using a mobile phone then type elements to include/exclude in the relevant boxes below.

To explore more about the mineralogy of the elements, [click here](#).

1																	2						
H																	He						
3	4																	10					
Li	Be																	B	C	N	O	F	Ne
Click on an element to select or deselect.																	13	14	15	16	17	18	
11	12																	Al	Si	P	S	Cl	Ar
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36						
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr						
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54						
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe						
55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86						
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn						
87	88	89																					
Fr	Ra	Ac																					
58	59	60	61	62	63	64	65	66	67	68	69	70	71										
Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu										
90	91	92																					
Th	Pa	U																					

Periodic Table coding © J.Ralph 2001-2020

Elements to include:		Elements to exclude:	
Return IMA-approved species only	☐	Return Unnamed 'species' only	☐
Essential elements only?	☐	Mineral class	- Any -
Include photos?	☐		

Clear
Exclude Unselected
Exclude Unselected $\geq$ Na
Search Minerals
Search Localities



<https://www.abpschools.org.uk/public/activescience/module5/game.html>

Group→ 1 2

Period
↓

1

2

3

4

5

6

7

	Mg 12

Interactive Periodic Table

Transition Elements

3 4 5 6 7 8

		P 15			

For more information,
click on any of the
groups + periods,
plus transition elements,
lanthanides and actinides

Place the element
correctly into the periodic table

Lanthinides

Actinides



Appearance:

Reactivity (air):

Reactivity (water/steam):

Reactivity (dilute acids):

Occurrence

As one of 4 allotropes; diamond - colourless and transparent in pure form; graphite - black, soft, lustrous; amorphous carbob - black pdr.; fullerenes

None

None

Slow

Occurs in more compounds than any other element;

Electron Shell: 2.4

Boiling point: 3900.0 °C

Melting point: 3500.0 °C

Score 2

Time 0:56

Best 0

Davis's Drug Guide for Nurses, 14th Edition by April Hazard Vallerand and Cynthia A. Sanoski



NURSE'S MED DECK

Type any drug name to browse for its details

Drug Name	Drug Card Link
1-Day	1-Day
1,25-dihydroxycholecalciferol	1,25-dihydroxycholecalciferol
2-amino-2-deoxyglucose sulfate	2-amino-2-deoxyglucose sulfate
3TC	3TC
40 Winks	40 Winks
5-FU	5-FU
6-thioguanine	6-thioguanine
8-Hour Bayer Timed-Release	8-Hour Bayer Timed-Release
abacavir	abacavir
abarelix	abarelix
abatacept	abatacept
abciximab	abciximab
Abelcet	Abelcet
Abenol	Abenol



LABORATORY
of THEORY of
BIOPOLYMERS

Andrzej Kolinski Research Group

RESEARCH

PEOPLE

PUBLICATIONS

TOOLS

CONTACT

TOOLS

CABS-DOCK

CABS-FLEX

CABS-FOLD

AGGRESCAN3D

CABS

SURPASS

CABS-NMR

PYCABS

CLUSCO

BBQ

BIOSHELL

CCOMP

MSITE

BIODESIGNER

IMOL

CABS-dock

server for protein-peptide docking and prediction of binding sites



CABS-flex

server for fast simulations of flexibility of protein structures



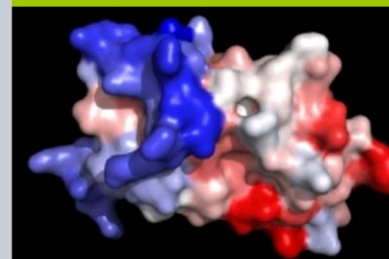
CABS-fold

server for de novo and consensus-based prediction of protein structure



AGGRESCAN3D

server for prediction of aggregation properties of protein structures





SchoolStore.fi

SchoolStore.fi

MITTAUSVÄLINEET PERUSKOULU, LUKIO, KORKEAKOULU

MENU ≡

Mittausvälineet kaikille kouluasteille

MITTAA, ANALYSOI JA OPI



LUE LISÄÄ!

SUORAAN TUOTTEISIIN

[Find My Dealer](#)
[Create Account](#)
[Sign In](#)





[Products](#)
[Subjects](#)
[Experiments](#)
[Training](#)
[Support](#)
[Downloads](#)
[Company](#)

[Home](#) > [Products](#) > [Software](#) > Graphical Analysis 4

Graphical Analysis™ 4



Collect, share, and analyze sensor data with our free software for Chrome™, Windows®, macOS™, iOS, and Android™.


[Download for Windows](#)


[Download for macOS](#)


[available in the chrome web store](#)


[Download on the App Store](#)

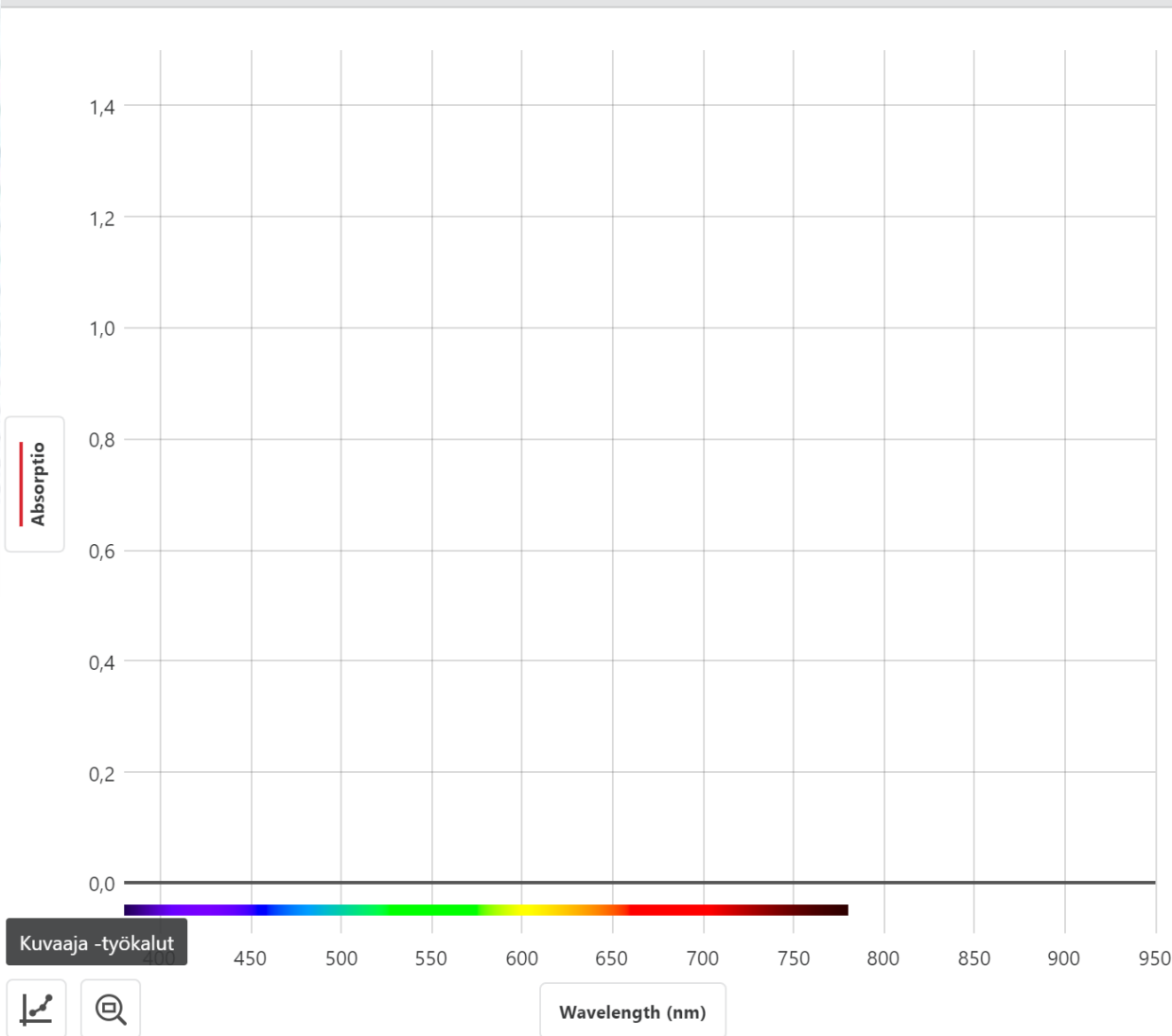

[GET IT ON Google Play](#)

Spectral Analysis

Vernier Spectral Analysis

Nimetön

MITTAA



	Dataraja 1	
	Wavelength (nm)	Absorptio
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

GET STARTED



HOW IT WORKS



CLASS RESOURCES



COMMUNITY



SUPPORT



MY CLASSROOM

GET MINECRAFT: EDUCATION EDITION

First, [Confirm your device](#) is ready to run Minecraft: Education Edition.

If you already have Minecraft: Education Edition installed, follow these [instructions](#) to get the update (version 12.5).

If you are NEW to Minecraft: Education Edition, download the app:



Recommended for your device:

Windows Desktop

[DOWNLOAD NOW](#)

Available Platforms:



Download for Windows

[DESKTOP](#)

Download [Windows Store Version](#)



Download for Apple

[MAC](#)

[IPAD](#)

Opettajien apuvälineitä – metakognitiiviset työkalut

Kts.

<http://www.loukomies.fi/blogi/mielen-metataidot-nuo-ajatustimpurin-työkalut>

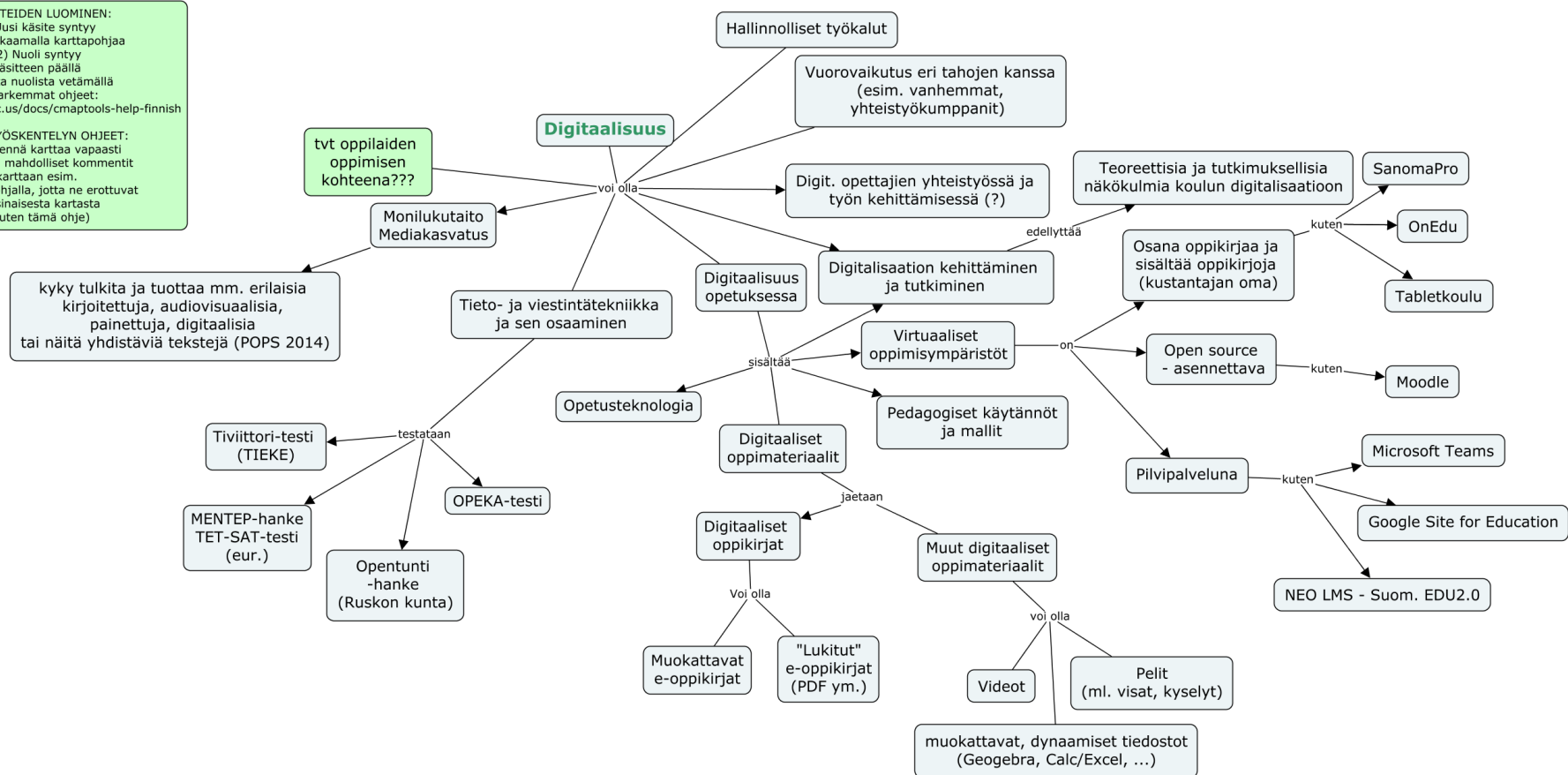
Digitaalisuus osana opetusta ja opetusharjoittelua (Toteemi-hanke)

KÄSITTEIDEN LUOMINEN:

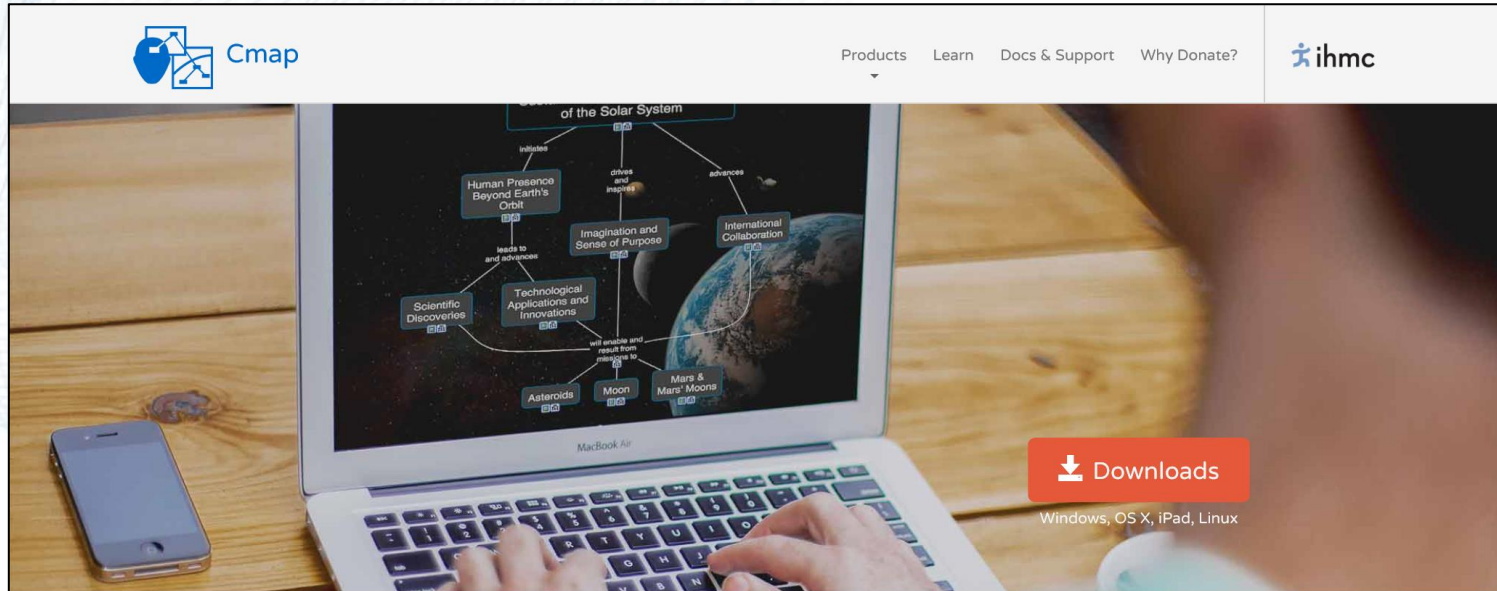
- 1) Uusi käsite syntyy tuplaklikkaamalla karttapohjaa
- 2) Nuoli syntyy käsitteen päällä olevista nuolista vetämällä
- 3) Tarkemmat ohjeet: <https://cmap.ihmc.us/docs/cmaptools-help-finnish>

RYHMÄTYÖSKENTELYN OHJEET:

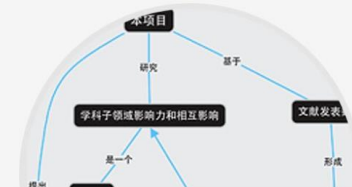
- 1) Täydennä karttaa vapaasti
- 2) Kirjoita mahdolliset kommentit karttaan esim. vihreällä pohjalla, jotta ne erottuvat varsinaisesta kartasta (kuten tämä ohje)

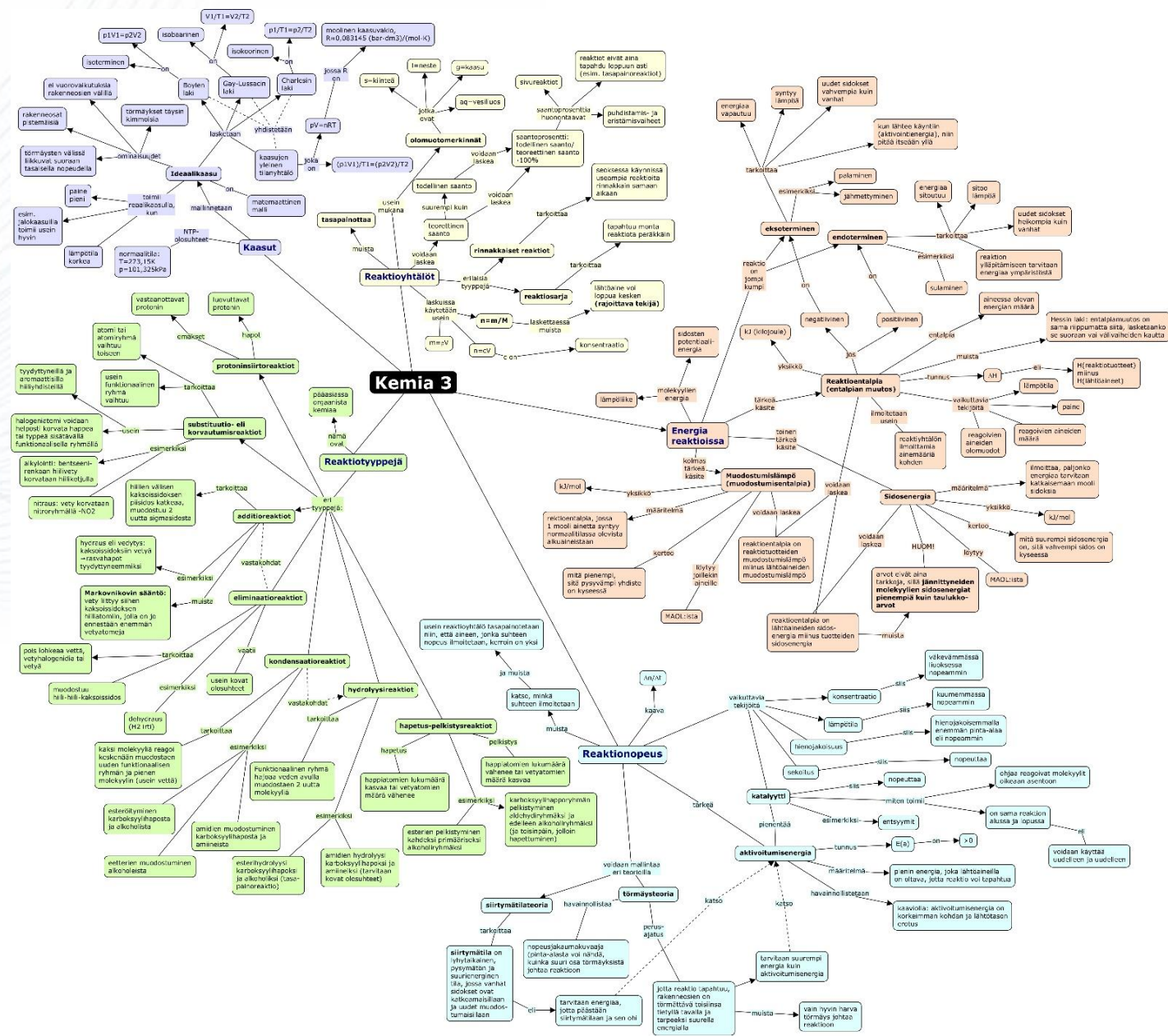


Käsitekarttaohjelma - CmapTools



Cmap software is a result of research conducted at the Florida Institution of Human & Machine Cognition (IHMC). It empowers users to construct, navigate, share and criticize knowledge models represented as concept maps.





Miellekartat - Freemind

Oppimispolut - Canva

- Miellekartat
 - http://freemind.sourceforge.net/wiki/index.php/Main_Page
 - <https://www.mindmup.com/>
- Canva Learn:
<https://designschool.canva.com/>

Tehtävä 1

- Laatikaa seuraavien käsitteiden avulla käsitekartta CmapTools-ohjelmalla
 - Atomi, elektroni, protoni, ydin, neutroni, isotooppi, elektroniverho, sähköinen vuorovaikutus, ... (mitä muuta tulee parilla ensimmäisellä tunnilla esille?)
 - Metalli, metallisidos, epämetalli, ionisidos, kovalenttinen sidos, poolisuus, elektronegatiivisuus, pooliton, poolinen, dipoli, dipoli-dipoli-sidos, ioni-dipoli-sidos, vetysidos, dispersiovoimat, ... (mitä muuta tulee sidoksien käsittelyn yhteydessä tunnilla esille?)



Videoiden teko – Screencast - O - Matic

[BLOG](#) [TUTORIALS](#) [SUPPORT](#)

SCREENCAST  MATIC [for Education](#) [for Work](#) [for Developers](#) [Product](#) [Pricing](#)

myllyviita63@gmail.com



Start Recorder

Try it for **Free** for 30 days

Open Video Editor

Download Install

 Uploads

 My Plan

 Earn Rewards

 Solo Plans

Solo Plans

 Team Plans

You are currently using a **Free** plan. **Upgrade to unlock extra features.**

Solo Deluxe

\$**1.50**/month (billed yearly)

Upgrade Recorder

Pro Recorder + Video Editor

Solo Premier

\$**4.00**/month (billed yearly)

Upgrade Recorder

Deluxe + Hosting + Secure Backup



Word Clouds - Sanapilvet

https://worditout.com/

WordItOut

+ Create

Discover

Community

Transform your text into word clouds!

What's a word cloud?

An attractive arrangement of randomly positioned words, where the most important words are bigger than the others.

What are they for?

Mostly for fun! ...and now you can print them automatically onto items: a great idea for making custom gifts! Plus they are fantastic at summarising large documents (reports, speeches, questionnaires, etc), teaching kids and more...

Discover other examples

Create your own

Great idea: make personalised gifts!



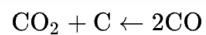
Features

WordItOut is the word cloud generator that gives you control with many custom

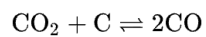


Featured word clouds

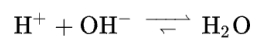




```
\ce{ CO2 + C <- 2CO }
```



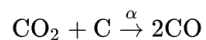
```
\ce{ CO2 + C <=> 2CO }
```



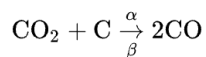
```
\ce{ H+ + OH- <=>> H2O }
```



```
\ce{ $A$ <-> $A'$ }
```

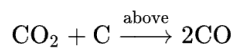


```
\ce{ CO2 + C ->[\alpha] 2CO }
```



```
\ce{ CO2 + C ->[\alpha][\beta] 2CO }
```

As with ^ and _ the content above and below reaction arrows is set in math font. When you want to put descriptive text there, use the \text command. Or, as a shortcut, you could type a 'T' between reaction arrow and opening bracket.



```
\ce{ CO2 + C ->[\text{above}] 2CO }
```

Tietotekniikan opettajan apuna

Kurssisuunnitelmat peda.netissä

Käyttäjät >



Myllyviita, Ari

Orbitaali 6 >

Kurssisuunnitelma KE6    

Kemian yo-tehtävät

Tiettyjä selventäviä asioita

Toiveita

 Sivukartta

 Haku

 Järjestely

Kurssisuunnitelma 2014-2015 KE61 ja KE62

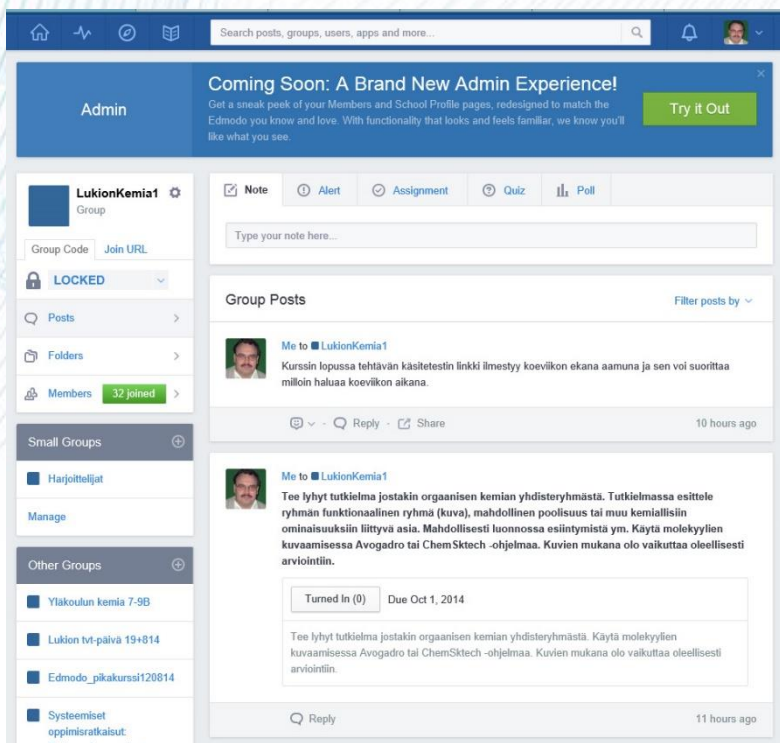
Kurssisuunnitelmarunko - taulukkoon on liitetty myös opetus.tv -sivuston videot (tutustu näihin ennen tunnin alkua).

h	Tunnin teema ja materiaali (linkit & pdf)	YO-TEHT	KE61	KE62
1	Kurssin tavoitteet ja arviointi - Kurssisuunnitelman läpikäynti, materiaali		to 27.11.	to 27.11.
2	Atomimallit - Orbitaaliteoria - atomiorbitaalit ja molekyyliorbitaalit Käsittekartan laatiminen aloitetaan CmapTools -ohjelman käyttö (lataa) - kemian käsitteet Kemian_kasitteet_listaus.docx Tuntisuunnitelma Opetus.tv -aineistoa: Kvanttimekaaninen atomimalli, Hundin ja Paulin sääntö Energiatasojen päällekkäin meneminen - Taulukko Elektronijakuamakaaviot (www.ptable.com), elektronikonfiguraatiot Erilaiset orbitaalit (KE2, kalvot) VSEPR-teoriaa - Youtube: http://youtu.be/keHS-CASZfc		ma 1.12.	pe 28.11.
3	Elektronegatiivisuus ja sidosteoriaa Molekyyliorbitaalit - sigma- ja pii-sidokset - kovalenttinen sidos Vahvat sidokset ja heikot sidokset - Opetus.tv / Poolisuus Ylioppilastehtäviä sidosteorioihin ja isomeriaan liittyen YO_tehtavat_jaottelu_sidosteoriaa_isomeriaa.pdf Tuntisuunnitelma: Vahvat ja heikot sidokset -kooste		ke 3.12.	ma 1.12.

Virtuaalinen opiskeluympäristö

Kannettavat tietokoneet

Editoivat e-kirjat (lukio)




Tehtävät ja kokeellisuus

Vastaukset
Sivukartta

Perustehtävät

3.1. Kvanttiluvut

3.1.1. Määrittele 4f-, 4d-
Täydennä siis alla olevat.

pääkvanttiluku
 n

$n = 3$

$n = 2$

$n = 1$

2.2 Jaksollisesta järjestelmästä saatava tieto

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomien ja ionien koostumista

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Atomiorbitaaliblogi

Virtuaalinen opiskeluympäristö VLE

Vertailu – LSM tai PLE

LMS – Learning Management System

- Hallinta ja johtaminen tärkein asia oppimisessa ja opetuksessa?
- Heikosti editoitavissa (vrt. Swiss knife)



PLE – Personal Learning Environment

- Käyttäjälähtöinen
- Käyttäjä valitsee itse omat työkalut ja työtavat (oma työkalu-laatikkoa)



VLE:t – poimi sinulle sopiva työkalu



- Course management systems (CMS): Moodle, Blackboard, Optima, Fronter, Edu 2.0 - NEO LMS, etc...
- Discussion forum based: Yammer, Edmodo, Facebook, etc...
- Platforms: Joomla, Drupal, WordPress, Elgg jne...
 - Create your own learning environment?
- Different web-technics: Wiki-, Blog-technics, Discussion forums jne.
- Web-based services



Kustomointi eli oppikirjan muokkaaminen omaan käyttöön sopivaksi (e-Oppi)

Henkilöt >

Peda.net

Henkilöt

Piilota toiminnot

Myllyviita, Ari

Uloskirjautuminen

Henkilöt >



Myllyviita, Ari

Orbitaali 2 - Viikki > 1. Johdatus kemian mikromaailmaan > 1.1 Atomimalli

1.1 Atomimalli

Julkisuus

Muokkaa

Silrrä

Polsta

+ Luo uusi

Atomimallin historiaa

Muokkaa

Silrrä

Polsta

Atomin rakennetta kuvaava tieteellinen malli on kehittynyt ajan kuluessa valtavasti. Kemiassa käsitteen "atomi" otti ensimmäisenä käyttöön **John Dalton** 1800-luvun alussa. Daltonin atomimalli oli työväline, jonka avulla pystyttiin määrittämään alkuaineiden atomien massojen suhteet toisiinsa nähden. Silloin niiden grammamääristä massaa ei vielä kuitenkaan tunnettu. Daltonin jälkeen vuonna 1897, atomimallia uudisti ensimmäisen elektronin löytäjä **Joseph Thomson**. Thomsonin mallin mukaan atomi on sähköisesti neutraali, joka koostuu + ja - merkkisesti varautuneista hiukkasista. Thomsonin mallia kutsutaan tuttavallisesti **rusinapullamalliksi**.

Pian Thomsonin jälkeen **Ernest Rutherford** teki sirontakokeen, jossa hän pommitti ohutta kultakalvoa **a-hiukkasilla**. Osa hiukkasista kimposi takaisin päin, mistä hän päätteli atomin koostuvan positiivisesti varautuneesta ytimeistä, jota negatiivisesti varautuneet elektronit kiertävät. Rutherford päätteli ytimen muodostavan valtaosan atomin massasta.

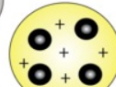
Seuraavaksi **Niels Bohr** kehitti Rutherfordin atomimallia ehdottamalla, että elektronit kiertävät ydintä ellipsin muotoisilla kiertoradoilla eri energiatasoilla. Tätä mallia kutsutaan **Bohrin malliksi**. Bohrin mallin

Dalton 1803



Thomson 1904

- positiiviset ja negatiiviset varaukset



Rutherford 1911

- ydin



Bohr 1913

- energiatasot



Schrödinger 1926

- elektronipilvimalli



Muokatta-
vuus

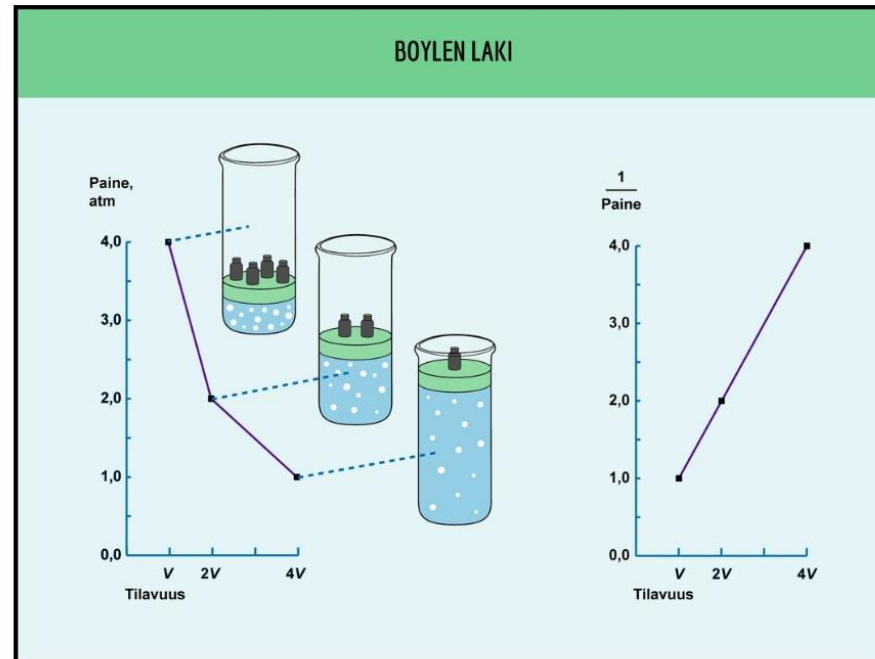
Tuo omia
kuvia

Boylen laki

Muokkaa Siirrä Poista

Boylen lain mukaan paineen (p) muutos ideaalikaasussa aiheuttaa käänteisen muutoksen kaasun tilavuudessa (V). Paineen ja tilavuuden suhteet ovat siis kääntäen verrannollisia. Boylen laissa oletetaan, että lämpötila T ja ainemäärä n ovat vakioita.

$$p_1 V_1 = p_2 V_2$$



Esimerkki: Jos astian tilavuus nelinkertaistuu, laskee sen paine samassa suhteessa.

$$V_1 = 1$$

$$V_2 = ?$$

$$P_1 = 4 \text{ atm}$$

$$P_2 = 1 \text{ atm}$$

Siirtyminen sähköisiin oppikirjoihin

Se on prosessi ja joskus kivulias

Verkko-oppimateriaalien kirjo voi olla moninainen, niidenkin valinnat perustuvat **pedagogisiin valintoihin**.

Valintoja voi koulu ohjata opiskeluympäristö (tai joidenkin mukaan oppimisympäristö) – valintojen kautta. Ovatko **oppimateriaalit osa opiskeluympäristöä vai ei**, on yleinen tilanne.

Netissä olevat valmiit materiaalit - **verkkosivut**

Kustantajien julkaisemat – **näköisversiot** – oppikirjoista

PDF- tai joku oma julkaisuformaatti

Ensimmäiset e-oppikirjat:

Hyödynnetty verkon mahdollisuuksia mm. animaatioiden ja videoiden osalta

Editoitavat e-oppikirjat:

Opettajat voivat muokata oppikirjat omaan opetukseen soveltuviksi, lisätä omaa aineistoa (painotuksien mukaan), jakaa kirjassa omia tehtäviä ym.

Opettajan autonomia:
Oikeus valita käytettävä oppikirja ?

Videot ja flipped classroom -pedagogiikka

- Opetus.tv – flipped classroom – pedagogiikan erinomainen lähtökohta
- Youtube: https://youtu.be/PplaBASQ_3M (esim. Minute physics)
- Vine - <http://vine.co/>



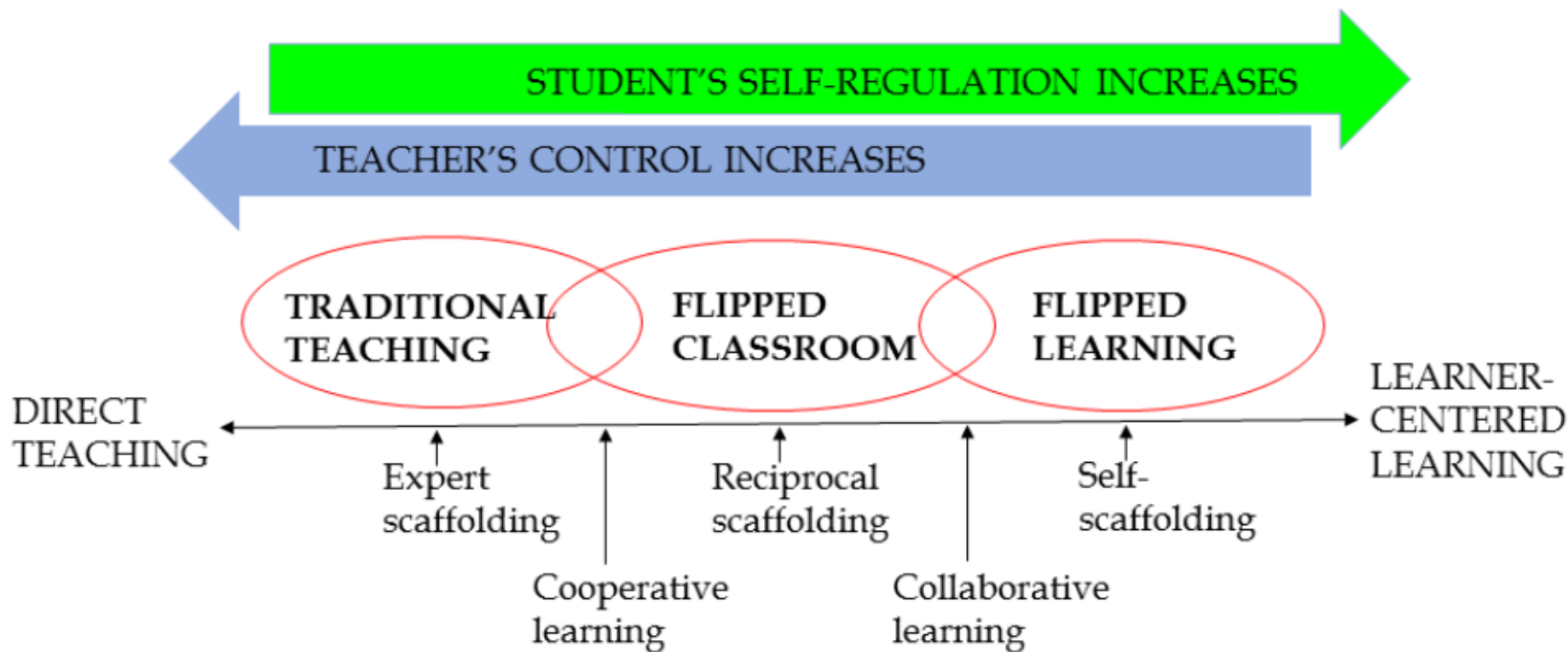


Figure 1. The dimensional view of the changes when switching from direct teaching to learner-centered learning.

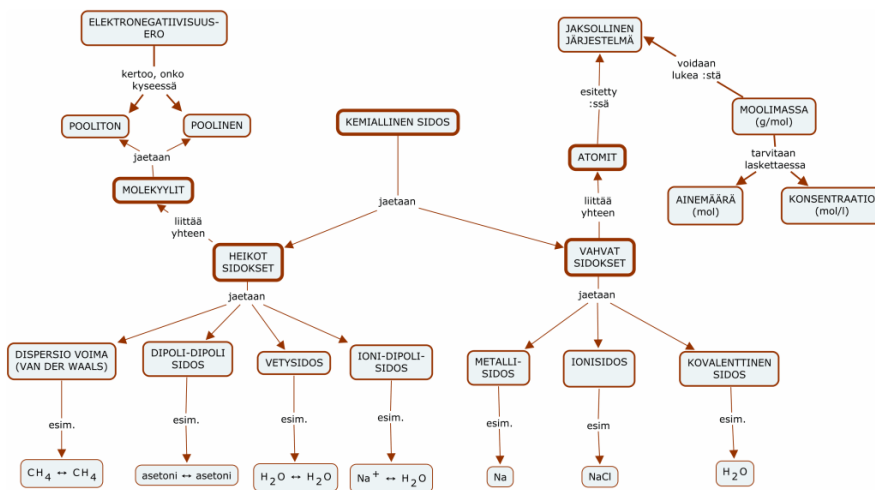
Opetus.tv ja Flipped classroom -pedagogiikka

Kemia 1 – Ihmisen ja elinympäristön kemia

1. Atomi
2. Jaksollinen järjestelmä
3. Ionisidos
4. Kovalenttinen sidos
5. Metallisidos
6. Elektronegatiivisuus
7. Elektronegatiivisuusarvot
8. Poolisuus
9. Heikot sidokset
10. Dispersiovoima
11. Liukoisuus
12. Atomimassa
13. Suhteellinen atomimassa
14. Mooli
15. Ainemäärä, moolimassa ja Avogadron vakio
16. Harjoituksia ainemäärällä
17. Massa- ja tilavuusprosentti
18. Konsentraatio
19. Yhteenvetodemonstraatioita
20. Kidevesi
21. Vastauksen ilmoittaminen kemiassa

Kemia 1 – Ihmisen ja elinympäristön kemia

1. Käsitekartta kurssin asioista



Samuli Turunen

Kemian ja biologian sisällöt Opetus.tv:ssä.

ChemDemos

[Home](#)
[Custom Demos](#)
[Demos](#)
[Contact](#)

Search Demos

Browse by Topic

[View All Demos](#)

- Acid-Base Equilibria
- Acids and Bases
- Analysis
- Atomic and Molecular Modeling
- Buffers
- Calorimetry
- Catalysis
- Chemical Bonding
- Chemistry of Skiing
- CIDER Communications in Chemistry Education
- Class Activities



Please read - These demos and simulations are free for chemistry educators. You **do not** need to order them or ask permission to use them. Bon appetit!

Simulointi - PhET

Simulaatiot kemiassa - PhET


[KIRJAUDU SISÄÄN](#)
[REKISTERÖIDY](#)
[KIRJAUDU SISÄÄN](#)
[REKISTERÖIDY](#)

Simulaatiot

Uudet simulaatiot

HTML5

Fysiikka

Biologia

► Kemia

Yleinen kemia

Kvanttikemia

Maantiede

Matematiikka

Kouluasteen mukaan

By Device

Kaikki simulaatiot

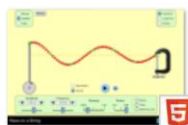
Käännetyt simulaatiot

Opettajille

Tutkimus

Accessibility

Tee lahjoitus



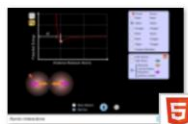
Aalto langassa



Alfasäteily



Atomien rakentaminen



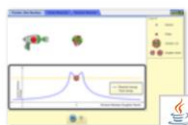
Atomien vuorovaikutukset



Beerin laki



Betasäteily



Fissio



Happo-emäs-liuokset



Ilmapallot ja hankaussähkö



Ilmapallot ja neste



Isotoopit ja atomimassa



Kaasun ominaisuudet



Kasvihuoneilmiö



Konsentraatio

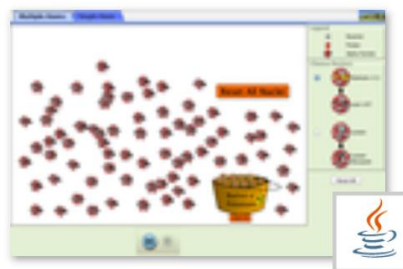


Käänteinen suunta

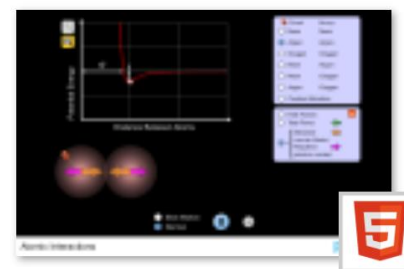
Simulaatit kemiassa – PhET (2)



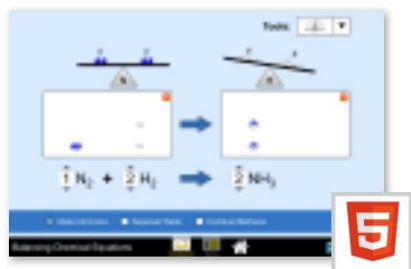
Acid-Base Solutions



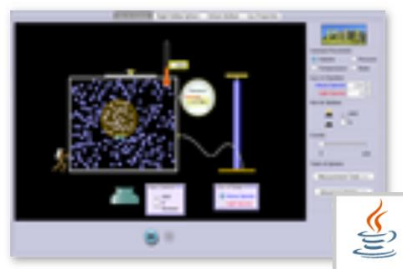
Alpha Decay



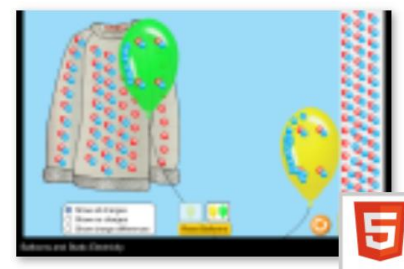
Atomic Interactions



Balancing Chemical Equations



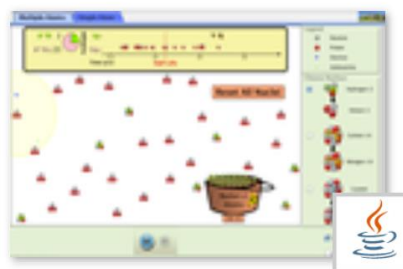
Balloons & Buoyancy



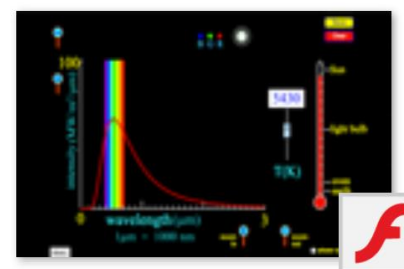
Balloons and Static Electricity



Beer's Law Lab



Beta Decay

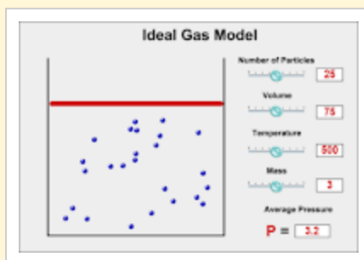


Blackbody Spectrum

Chemical Thinking Interactives

[Home](#)
[Submicro](#)
[Atomic Structure](#)
[Bonding](#)
[Molecular Structure](#)
[IMFs](#)
[Reactions](#)
[Thermodynamics](#)
[Kinetics](#)
[Comments](#)
[Contacts](#)

WELCOME!



This website includes a set of interactive educational resources used to support teaching and learning in introductory chemistry courses, particularly in the **Chemical Thinking** curriculum. We include links to simulations developed in-house or by other educational groups (e.g., [KCVS](#), [Molecular Workbench](#), [PhET](#)) to more actively engage students in the analysis of the properties and behaviors of different chemical systems.

We are transitioning to include only simulations developed using HTML5 which are compatible with all types of browsers and devices. These resources have been classified based on the topic or concept that they help address. We use them in the classroom to have students generate data that they can analyze, identify patterns in the properties of a system, test hypothesis, and verify predictions. Your questions, comments, and suggestions are welcomed [here](#).

Erilaisia opettajille sopivia työkaluja

- Liuosten valmistukseen (Merck):
 - Liuoksien laimentaminen:
<https://www.sigmaaldrich.com/chemistry/stockroom-reagents/learning-center/technical-library/molarity-calculator.html>
 - Kiinteä aine liuokseksi
<https://www.sigmaaldrich.com/chemistry/stockroom-reagents/learning-center/technical-library/mass-molarity-calculator.html>

Augmented Reality

4 Main Types of Augmented Reality You Have to Know

1. Marker-Based Augmented Reality

2. Marker-Less Augmented Reality

3. Projection Augmented Reality

4. Superimposition Augmented Reality

1. Marker-Based Augmented Reality

IQTM



Marker-Based AR is also called as Image Recognition or Recognition Based AR

3. Projection Augmented Reality



Projection-based AR is the interaction that is done by touching the projected surface with hand.

2. Marker-less Augmented Reality

IQTM



Marker-less AR is also called as Location-based AR .

4. Superimposition Augmented Reality



Superimposition-Based AR provides a replacement view of the object in focus

ThingLink.com

thinglink..

RATKAISUT ▾

HINNOITTELU ▾

BLOGI

ARTICLES

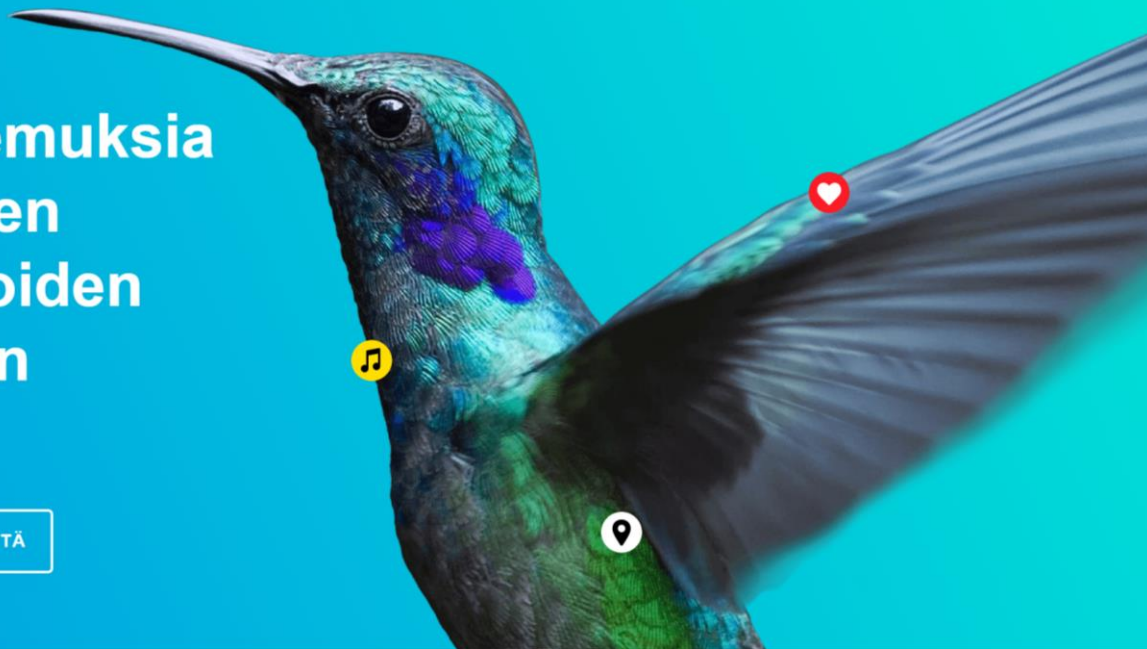
TUKI

KIRJAUDU SISÄÄN

**Rakenna
visuaalisia
oppimiskokemuksia
interaktiivisten
kuvien, videoiden
ja 360 median
avulla**

ALOITA TÄSTÄ

OTA YHTEYTTÄ



Trusted Partners

Sign up now or contact your closest Microsoft or Google for Education reseller.





360°/VR

Collections

Periodic Tab



Periodic Table of Elements w Chemical Group Block PubChem by Ari Myllyviita

SHARE

PERIODIC TABLE OF ELEMENTS

Hindenburg Explodes (1937)

**A PATHEGRAMS
RELEASE**

Edited by
E. W. CASTLE

COPYRIGHTED MCMXXXVII
THE UNITED STATES AND CANADA

Keskeytä (k)

0:03 / 5:26

⚙️ YouTube

Done

Radiolum alkali metal	Sternum alkaline Earth metal	Yttrium Transition metal	Zincium Transition metal	Nickelum Transition metal	Mercurium Transition metal	Technetium Transition metal	Ruthenium Transition metal	Rhenium Transition metal	Palladium Transition metal	Silver Transition metal	Cadmium Transition metal	Indium Transition metal	Tin Transition metal	Antimony Transition metal	Tellurium Transition metal	Iodine Transition metal	Xenon Noble gas
55 Cs Cesium alkali metal	56 Ba Barium alkaline Earth metal	.	72 Hf Hafnium Transition metal	73 Ta Tantalum Transition metal	74 W Tungsten Transition metal	75 Re Rhenium Transition metal	76 Os Osmium Transition metal	77 Ir Iridium Transition metal	78 Pt Platinum Transition metal	79 Au Gold Transition metal	80 Hg Mercury Transition metal	81 Tl Thallium Transition metal	82 Pb Lead Transition metal	83 Bi Bismuth Transition metal	84 Po Polonium Metalloid	85 At Astatine halogen	86 Rn Radon Noble gas
87 Fr Francium alkali metal	88 Ra Radium alkaline Earth metal	**	104 Rf Rutherfordium Transition metal	105 Db Dubnium Transition metal	106 Sg Seaborgium Transition metal	107 Bh Bohrium Transition metal	108 Hs Hassium Transition metal	109 Mt Meitnerium Transition metal	110 Ds Darmstadtium Transition metal	111 Rg Roentgenium Transition metal	112 Cn Copernicium Transition metal	113 Nh Nihonium Transition metal	114 Fl Flerovium Transition metal	115 Mc Moscovium Transition metal	116 Lv Livermorium Transition metal	117 Ts Tennessine halogen	118 Og Oganesson Noble gas
.	.	.	57 La Lanthanum Lanthanide	58 Ce Cerium Lanthanide	59 Pr Praseodymium Lanthanide	60 Nd Neodymium Lanthanide	61 Pm Promethium Lanthanide	62 Sm Samarium Lanthanide	63 Eu Europium Lanthanide	64 Gd Gadolinium Lanthanide	65 Tb Terbium Lanthanide	66 Dy Dysprosium Lanthanide	67 Ho Holmium Lanthanide	68 Er Erbium Lanthanide	69 Tm Thulium Lanthanide	70 Yb Ytterbium Lanthanide	71 Lu Lutetium Lanthanide
**	**	**	89 Ac Actinium	90 Th Thorium	91 Pa Protactinium	92 U Uranium	93 Np Neptunium	94 Pu Plutonium	95 Am Americium	96 Cm Curium	97 Bk Berkelium	98 Cf Californium	99 Es Einsteinium	100 Fm Fermium	101 Md Mendelevium	102 No Nobelium	103 Lr Lawrencium

**Lisättyä todellisuutta
opetukseen:**
[https://sites.google.com/
site/lisaettytodellisuus/o
ppaat-ja-vinkit/thinglink](https://sites.google.com/site/lisaettytodellisuus/opaat-ja-vinkit/thinglink)