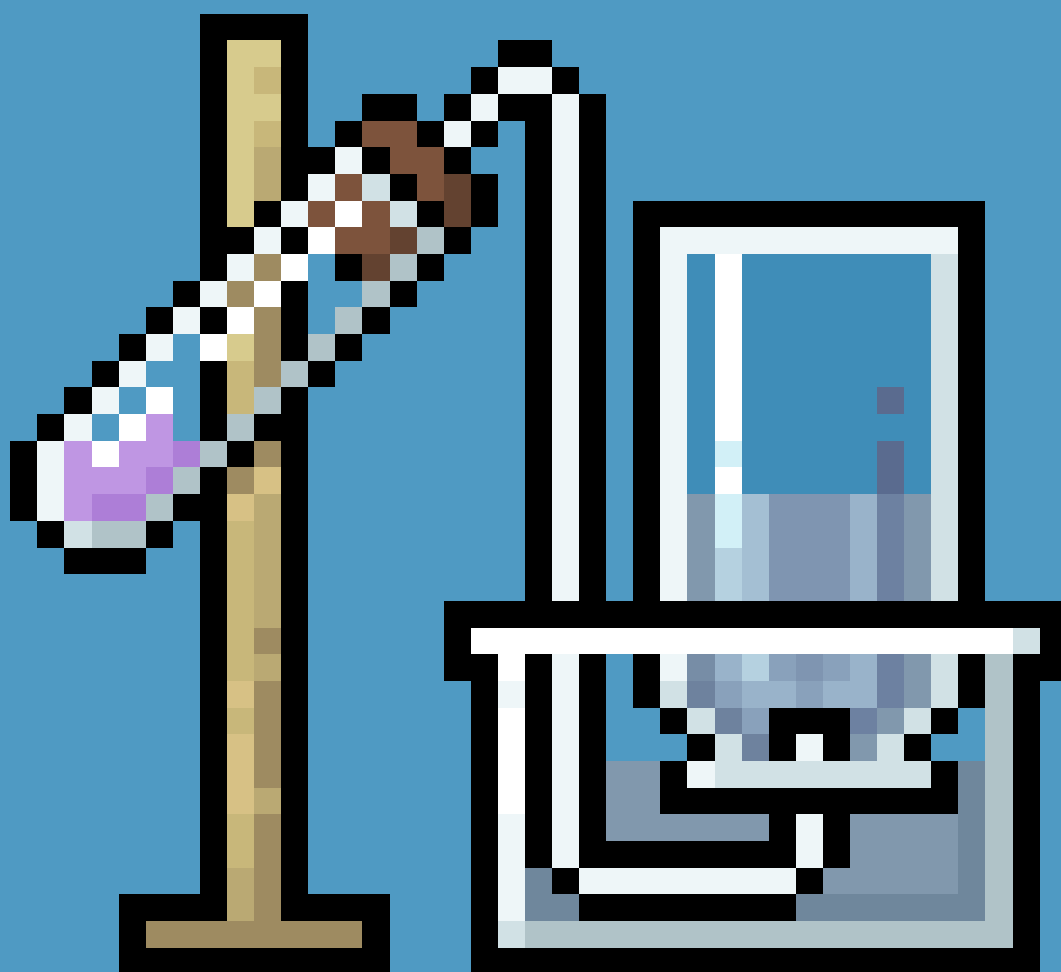




MINECRAFT
EDUCATION EDITION

CHEMISTRY LAB JOURNAL

education.minecraft.net

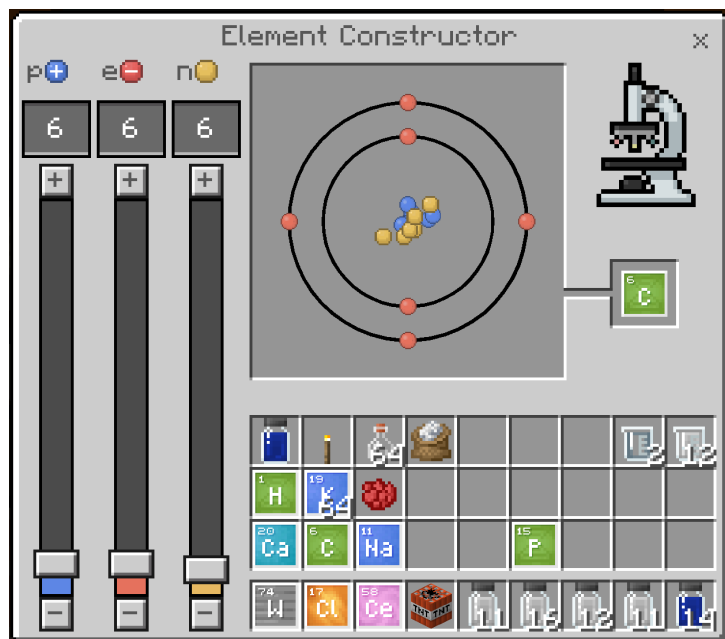
The Chemistry Update for Minecraft: Education Edition offers exciting new tools to explore the world of chemistry in Minecraft. The Chemistry Resource Pack allows you and your students to conduct experiments within Minecraft that simulate real world science.

This guide explains the different crafting stations, new items in the Chemistry Resource Pack and how to craft products by combining compounds with Minecraft items to make helium balloons, glowsticks, bleach, super fertilizer, underwater torches and more.

Image	Name	Usage
	Element Constructor	Build elements by choosing the number of protons, electrons, and neutrons.
	Compound Creator	Create over thirty compounds by combining elements.
	Lab Table	Design your own experiments by combining substances and observing the results.
	Material Reducer	Learn about the natural world by reducing Minecraft blocks to their component elements.

ELEMENT CONSTRUCTOR

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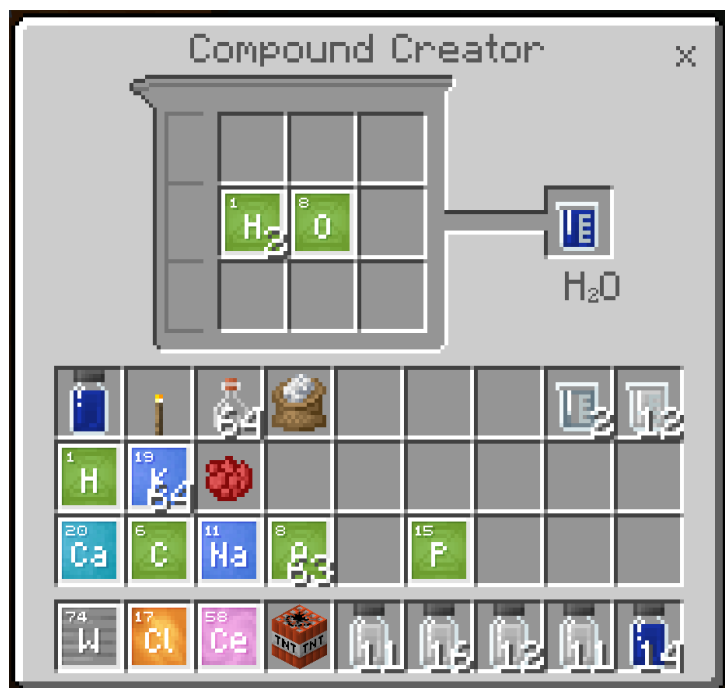
Use the Element Constructor by right clicking on it, just like a regular crafting table. Create elements by moving the sliders to choose the desired number of protons, electrons, and neutrons or type the numbers into the fields at the top. By using the Element Constructor, you can create 118 elements and over 400 isotopes.

Want to check the subatomic particles of a particular element? Drop an element from your inventory into the output box of the Element Constructor to see the number of protons, electrons, and neutrons.

For a complete list of craftable elements and isotopes please visit the link below:

<https://aka.ms/elementconstructor>

COMPOUND CREATOR



Use the Compound Creator by right clicking on it, just like a regular crafting table. Create compounds by adding the appropriate type and number of elements to the grid. The compound you have created will appear in the output box on the righthand side. The location of the elements on the grid does not affect the result. By using the Compound Creator, you can create over 30 different compounds.

CRAFTABLE COMPOUNDS

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Here are the compounds you can create using the Compound Creator in Minecraft.

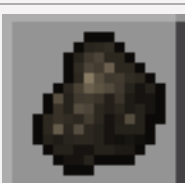
Image	Compound Name	Chemical Formula
	Aluminum Oxide	Al_2O_3
	Ammonia	NH_3
	Barium Sulfate	BaSO_4
	Benzene	C_6H_6
	Boron Trioxide	B_2O_3
	Calcium Bromide	CaBr_2
	Charcoal	$\text{C}_7\text{H}_4\text{O}$
	Crude Oil	C_9H_{20}

Image	Compound Name	Chemical Formula
	Glue (Cyanoacrylate)	$\text{C}_5\text{H}_5\text{NO}_2$
	Hydrogen Peroxide	H_2O_2
	Ink	FeSO_4
	Iron Sulfide	FeS
	Latex	C_5H_8
	Lithium Hydride	LiH
	Luminol	$\text{C}_8\text{H}_7\text{N}_3\text{O}_2$
	Lye	NaOH

COMPOUNDS (CONT.)

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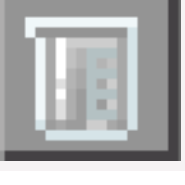
Image	Compound Name	Chemical Formula
	Magnesium Nitrate	$\text{Mg}(\text{NO}_3)_2$
	Magnesium Oxide	MgO
	Polyethylene	$(\text{C}_2\text{H}_4)_n$
	Potassium Iodide	KI
	Salt	NaCl
	Soap	$\text{C}_{18}\text{H}_{35}\text{NaO}_2$
	Sodium Acetate	$\text{C}_2\text{H}_3\text{NaO}_2$
	Sodium Fluoride	NaF

Image	Compound Name	Chemical Formula
	Sodium Hydride	NaH
	Sodium Hypochlorite	NaClO
	Sodium Oxide	Na_2O
	Sugar	$\text{C}_6\text{H}_{12}\text{O}_6$
	Sulfate	SO_4
	Water	H_2O

COMPOUNDS (CONT.) CHLORIDES

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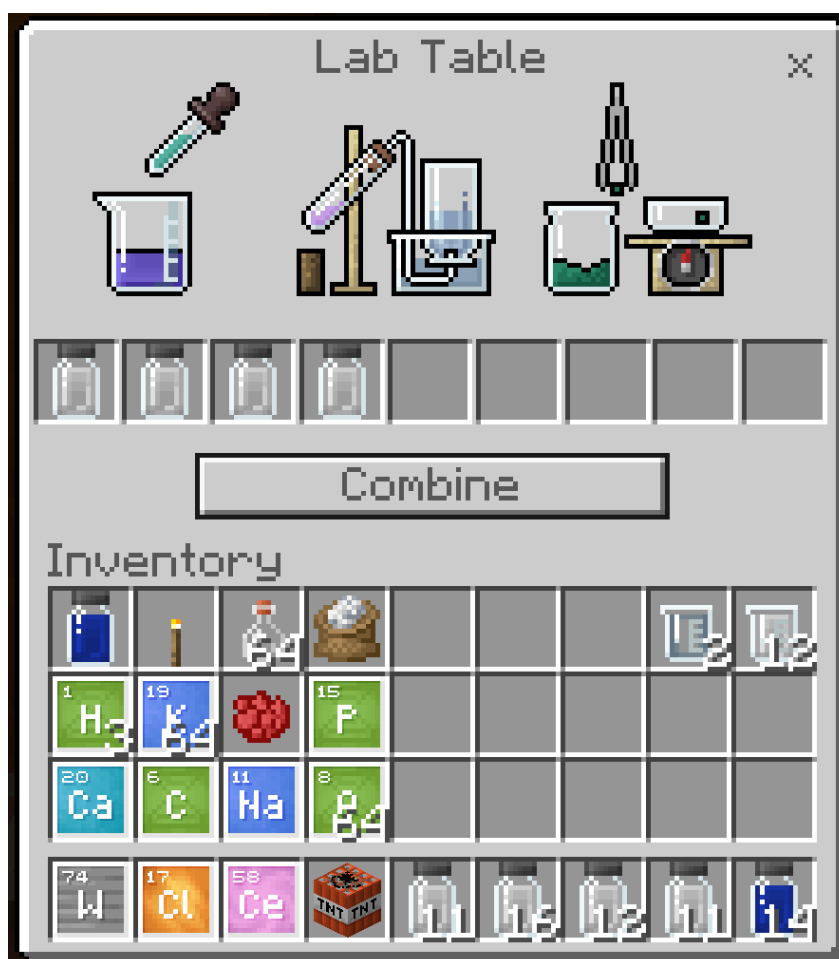
Image	Compound Name	Chemical Formula
	Calcium Chloride	CaCl_2
	Cerium Chloride	CeCl_3
	Mercuric Chloride	HgCl_2
	Potassium Chloride	KCl
	Tungsten Chloride	WCl_6

LAB TABLE

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Use the Lab Table by right clicking on it, just like a regular crafting table. Create products by adding the appropriate type and number of elements and/or compounds to the grid. When ready to conduct the experiment, click the 'Combine' button. If you have created a viable product, you will notice that the images at the top will animate to indicate that you have produced a liquid, gas, or solid. The location of the materials on the grid does not affect the result. The product you have created will appear after clicking combine.

If the materials you have combined did not create a viable product, the process will result in a 'garbage' item.



LAB TABLE PRODUCTS

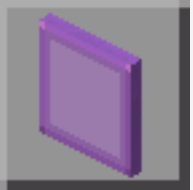
Here are the products you can create using the Lab Table in Minecraft.

Image	Name	Recipe	Usage
	Bleach	Water x3 + Sodium Hypochlorite x3	When used at the crafting table will turn colored wool, carpets, beds, and banners white.
	Heat Block	Iron + Water + Charcoal +Salt	Melts snow and ice just like a torch.
	Ice Bomb	Sodium Acetate x4	Transforms water blocks to ice blocks.
	Super Fertilizer	Ammonia + Phosphorus	Grows plants to maturity in a single use.

CRAFTING TABLE PRODUCTS

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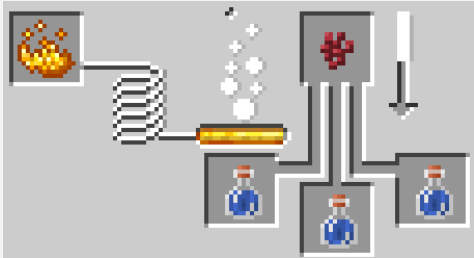
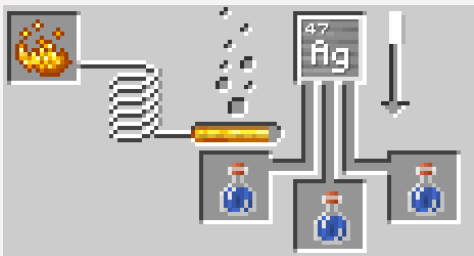
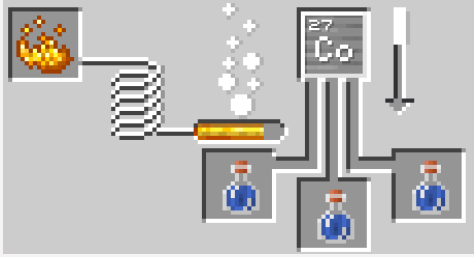
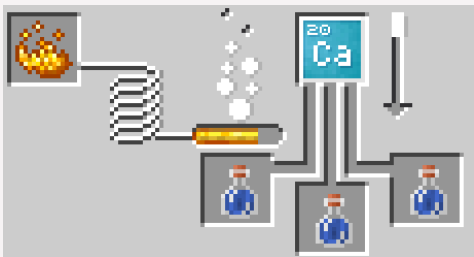
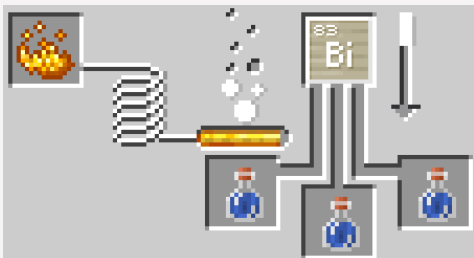
Some products require a combination of chemical compounds and Minecraft blocks. These products are created using a traditional Minecraft crafting table.

Image	Name	Recipe	Usage
	Colored torches: Blue = Cerium Chloride Red = Mercuric Chloride Purple = Potassium Chloride Green = Tungsten Chloride		Combining various chlorides with a torch will change the color.
	Glow Stick		Combine colored dye + polyethylene x6 + luminol + hydrogen peroxide. Glows when shaken
	Hardened Glass Panes and Blocks		Aluminum Oxide x3 + Stained Glass Pane/Block x3 + Boron Trioxide x3 will produce hardened glass which takes much longer to break than normal.
	Balloon		Latex x6 + colored dye + helium + a lead will produce a helium balloon. Balloons can be attached to fences, shot with arrows, and lift mobs into the air.
	Sparklers: Orange = Calcium Chloride Blue = Cerium Chloride Red = Mercuric Chloride Purple = Potassium Chloride Green = Tungsten Chloride		Combining one of the elements mentioned with magnesium and a stick will create sparklers. Sparklers can be used as an offhand item.
	Underwater TNT		Sodium + TNT, will create an alternate version of TNT which will damage blocks even when underwater.
	Underwater Torches		Combine magnesium with a torch to create an Underwater Torch. This kind of torch can be used underwater.

BREWING STAND PRODUCTS

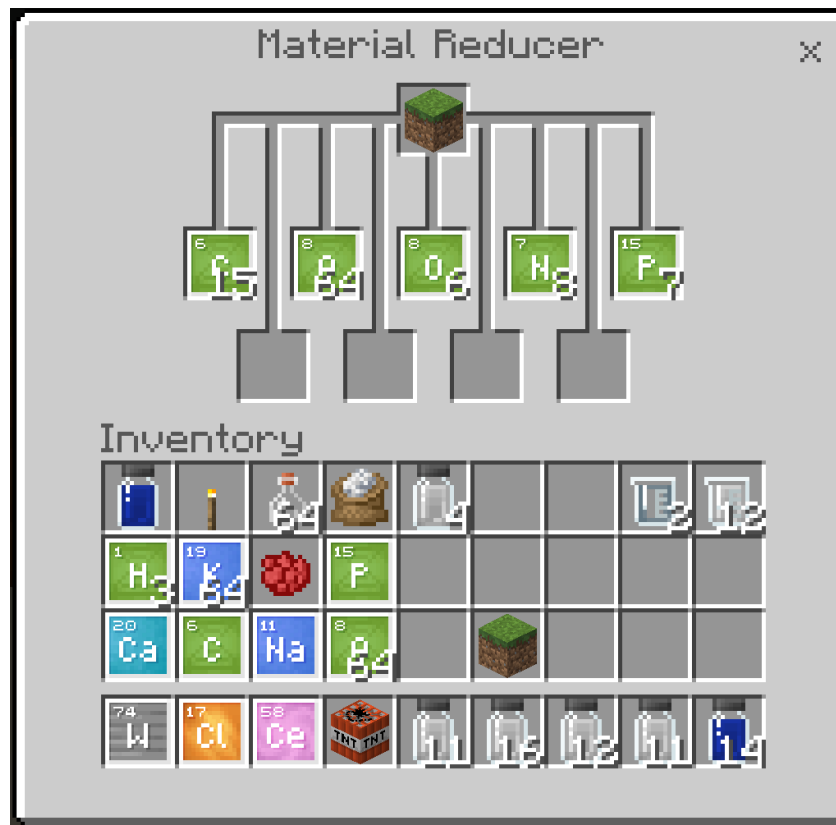
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Here are the products you can make using the Brewing Stand in Minecraft.

Image	Name	Recipe	Usage
	Awkward Potion		Used as a base for brewing potions in Minecraft. Nether wart + blaze powder + water bottle
	Antidote		Cures poison. Silver + blaze powder + awkward potion
	Elixir		Cures weakness. Cobalt + blaze powder + awkward potion
	Eye drops		Cures blindness. Calcium + blaze powder + awkward potion
	Tonic		Cures nausea. Bismuth + blaze powder + awkward potion

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Note: Some Minecraft blocks such as soul sand and netherrack contain mysterious elements yet to be discovered in our world and as such will be represented by a question mark block ?



GET STARTED!

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The following lessons will help you to quickly get started teaching with the new chemistry features of Minecraft: Education Edition.

WHAT IS THE WORLD MADE OF?

Ages 10 and up

Learning Objectives:

- Understand objects are all made of elements.
- Discover the elemental composition of Minecraft blocks.
- Understand that some elements are more common than others

Classroom Activities:

- Collect and analyze materials from their Minecraft world to find elemental compositions using the material reducer tool that breaks Minecraft blocks into elements and compounds.
- Discuss what types of materials have similar elemental compositions and why

Full lesson: <https://aka.ms/whatistheworldmadeof>

ATOMIC STRUCTURE AND ISOTOPES

Ages 10 and up

Learning Objectives:

- Understand that atoms are composed of neutrons, protons and electrons.
- Understand that elements are defined by the number of protons in their nucleus.

Classroom activities:

- Discuss how atoms are composed of electrons, protons and neutrons, how the atomic number of an element is the same as the number of protons it has, and that the number of neutrons in an atom can vary, which creates isotopes.
- Students use the element constructor to produce a 3-5 elements and their isotopes.
- Notice how the atomic number correlates with the number of protons in the atom.
- Use the compound creator to make molecules using different isotopes.

Full lesson: <https://aka.ms/atomicstructures>

ADDITIONAL RESOURCES:

Visit us on the web at <https://education.minecraft.net/> to discover new lesson plans and ways to use the chemistry update to its fullest potential in your classroom.

NEED HELP?

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Visit our knowledge base <https://education.minecraft.net/support/knowledgebase/> to find articles and how-to manuals to help you master Minecraft: Education Edition. Can't find what you're looking for? Contact us via the 'Support' tab and we'll follow up with you personally to address your issue.



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