student experiment (sem) module chemistry

Support stand material is manufactured from NTL's special aluminium profile, making it very durable and resistant to chemicals. Glassware is made of Borosilicate glass, and the test tubes feature very thick walls. Stoppers are made of silicone, a material that is food-safe, remains highly elastic for a very long time, has a high melting point and is very resistant to chemicals. The kit includes protective gloves as well as support stand fittings for attaching a protective screen.

C9900-4A Chemistry – Stand material

Qty.	Item No.	Description
1	DS100-1H	Support base, aluminium special profile as H-shaped base, for multifunctional use incombination with sliding saddles
2	DS102-12	Stand rail base, L=125 mm, Alu
2	DS400-1K	Bosshead demo, special Aluminium material with M8 – setscrews
2	DS140-2R	Sliding saddle, horizontal type, Alu
1	DS103-04	Sliding saddle, H = 40 mm, Alu
1	DS502-02	Support ring steel, D = 102 mm, with bosshead
2	DS502-62	Support ring steel, D = 62 mm, with bosshead
1	P7240-1G	Rod 500x10 mm, nickel plated steel
1	C7002-1A	Universal clamp, 0 – 80 mm, with cork
1	C7420-1S	Spatula spoon, steel, 150x18 mm
1	C7420-2S	Spatula double, flat, steel, 180x11 mm
1	C8020-1A	Mortar, porcelain, D=100 mm
1	C8020-2A	Pestle, porcelain, L=110 mm
1	C8000-3B	Crucible, porcelain, 35 ml
1	C8010-1C	Evaporating dish, porcelain, 75 ml
1	C7415-2Z	Crucible tong, steel, L=200 mm
1	C7205-1A	Test tube holder, wooden, 10 – 30 mm
1	C7418-2A	Knife for laboratory use, stainless steel
1	C1570-1S	Pipette, measuring type, 10 ml, graduation in 0,1 ml
1	C7223-1A	Triangle from steel wire with clay tubes (60 mm each)
1	P7125-1B	Wire gauze with ceramic center, 150x150 mm
1	C7205-2A	Test tube rack, wooden, for 12 Test tubes, Hole-Dia = 22 mm, with 6 dropping sticks
1	C7418-1A	Forceps, pointed ends, stainless steel, L=115 mm
1	C6020-1C	Stirring rod, glass, 8x250 mm
1	C7600-1A	Gloves, pair of, for heat-protection
1	C7445-7G	Tube, rubber, 7/10 mm, L=1000 mm
1	C7413-1A	Deflagration spoon, L = 450 mm
		Storage:
1	C7806-4A	Box-insert Chemistry-stands
1	P7806-1B	plastic box big, with cover
		Plan for storage of all components

C9900-4B Chemistry – Glass material

Qty.	Item No.	Description
1	C1000-1B	Beaker glass, 100 ml, squat form, Boro
1	C1000-1C	Beaker glass, 150 ml, squat form, Boro
1	C1000-1D	Beaker glass, 250 ml, squat form, Boro
1	C1370-1B	Funnel plastics, Dia = 75 mm
1	C1020-1D	Erlenmeyer flask, warrow neck, 250 ml
1	C1055-1H	Test tube with side arm, 30x200 mm
1	C1380-2A	Cylinder glass, plane face ground rim, 200x55 mm
1	C1064-1A	Separatory funnel, cylindrical, with stopper
1	C7520-1A	Cobalt glass plate, very dark blue, 50x50x2 mm
2	B7505-1A	Microscope glass slide, 76x25x1 mm
1	C1385-1A	Cover plate, Dia = 75 mm, one side grounded
1	C6120-1C	Watch glass, Dia = 100 mm
1	C6030-1M	Glass tubes 5/8 mm, set of 7, different shapes
12	C1050-1C	Test tube, 16x160 mm, Borosilicate glass
1	B7804-1A	Magnifier for students, plastics, 3x and 5x
2	C6150-2A	Pipette glass, with rubber bulb, 5 ml
1	C7530-1A	Test tube brush, Dia = 17 mm
1	P2220-1A	Thermometer, -10 / +110 /1,0 °C, alcohol-filled
4	C7320-1C	Stopper, blue silicone, 12,5/18/27 mm
2	C7320-1D	Stopper, blue silicone, 12,5/18/27 mm, 1 hole
1	C7320-4B	Stopper, blue silicone, 26/32/30 mm, 1 hole
1	C7320-5B	Stopper, blue silicone, 31/38/35 mm, 1 hole
1	C7540-1A	Pipette filler, rubber
		Storage:
1	C7806-4B	Box-insert Chemistry-glass,
1	P7806-1B	plastic box big, with cover
		Plan for storage of all components

student experiment module (sem) chemistry

With the distillation-set C9900-4C are additional experiments on “distillation” possible. With the elektrochemistry-set C9900-4E are 13 additional experiments on “elektrochemistry” possible

C9900-4E Electrochemistry

Qty.	Item No.	Description
1	DE921-3A	Clamp with banana plug
1	C3082-4C	U-tube with side arms, glass, NB 19/26
1	C7118-2A	Boss head on rod for electrodes
1	P3310-1A	Alligator clip
1	C7118-2B	Adapter for P3910-2B
1	P3910-2B	PIB socket for incandescant lamp E10
1	C1000-1B	Glass beaker 100 ml
1	P3320-1I	Incandescant lamp E 10 / 10 V / 0,05 A
1	P3310-3A	Connecting lead 50 cm, red
2	P3310-3B	Connecting lead 50 cm, blue
2	C7124-5A	Electrode, carbon 150 x 8 mm
1	C7124-4A	Electrode, copper 150 x 8 mm
2	C7124-6A	Electrode, nickel 130 x 4 mm
2	P7130-4B	Silicon stopper, 17/22/25 mm, 1 hole
		Storage:
1	C7806-4E	Box-insert Electrochemistry
1	P7806-1A	Plastic box small, with cover. Plan for storage of all components

C9900-4C Distillation (GL)

Qty.	Item No.	Description
1	C3601-01	Flask with round bottom and narrow neck
1	C3601-03	Adapter for distillation
1	C3601-06	Cooling tube, 2 screw-on lids and 2 plastic hose connectors with screw-on lids
1	C3601-21	Gas discharge tube, curved
1	C6514-13	Thermometer, chemical, -10 ... +110 °C, filled with alcohol
		Storage:
1	P7806-1A	Storage box, small
1	C7806-4C	Foam insert for distillation (GL)

Ordering information for Module CHEMISTRY

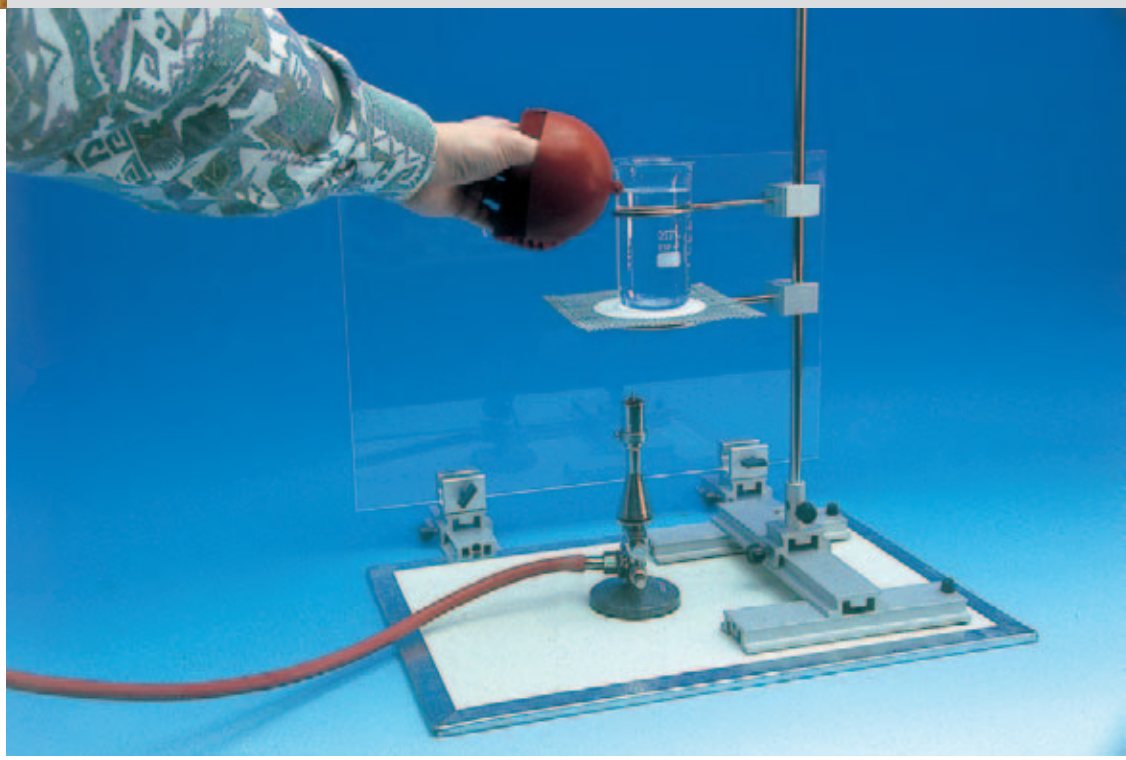
C9900-4A Chemistry/Stand
C9900-4B Chemistry/Glass
C9160-4A Manual Chemistry

Suggested accessories:
C9900-4E Electrochemistry
C9900-4C Destillation (GL)

P3130-3D Student power Supply
P3240-1C Measuring instrument

Experiments with chemistry

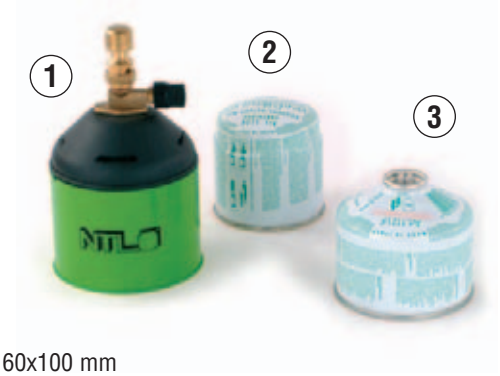
CHS 1.1	**Pure substances are rarely found in the nature**
CHS 1.1.1	Some methods of physically separating substances
CHS 1.1.1.1	Where did the salt go?
CHS 1.1.1.2	Why fish can breathe - air in water
CHS 1.1.1.3	On the gold diggers' trail decantation
CHS 1.1.1.4	Salt from blood and claws evaporation
CHS 1.1.1.5	Your Own Sewage Treatment Plant
CHS 1.1.1.6	A miraculous method of bleaching distillation
CHS 1.1.1.7	Like a gem crystallization
CHS 1.1.1.8	Who is who?
CHS 1.1.2	Dissolving Bonds by Chemical Reaction
CHS 1.1.2.1	Carbon from sugar/ How sugar carbonizes
CHS 1.1.2.2	The effervescent powder factory
CHS 1.1.3	Chemical Elements Can be Derived from Compounds
CHS 1.1.3.1	Black from white/ extracting carbon
CHS 1.1.3.2	The golden nail
CHS 1.1.3.3	The reflector tube
CHS 1.2	**Electrical Conductors and Insulators**
CHS 1.2.1	Conductivity of different materials
CHS 1.2.1.1	When does the light bulb glows?
CHS 1.2.1.2	Following Ritter's footsteps
CHS 1.2.2	Bonding of ions (ion lattice, ion movement)
CHS 1.2.2.1	It doesn't dissolve!
CHS 1.2.2.2	Remarkably unremarkable
CHS 1.2.2.3	With the water comes the colour
CHS 1.2.2.4	Like a hygrometer
CHS 1.2.2.5	The wanderers
CHS 1.3	**New substances may be formed using electric current**
CHS 1.3.1	Electrolysis of a salt solution
CHS 1.3.1.1	Brown stripes/ Electrolysis of a zinc oxide solution
CHS 1.3.1.2	The reverse/ Electrolysis of a copper sulfate solution
CHS 1.3.1.3	Exchanging electrodes
CHS 1.3.2	Technical significance of electrolysis
CHS 1.3.2.1	Signs of decay/ Electrolytic refinement of copper
CHS 1.3.2.2	The decorative key/ Copper plating a key
CHS 2.1	**Chemistry – the world of substances**
CHS 2.1.1	Changing the characteristics of substances – typical features of reactions
CHS 2.1.1.1	Two color printing
CHS 2.1.1.2	Gas is free/ development of gases
CHS 2.1.1.2	The red flame of alcohol
CHS 2.1.1.3	Smell
CHS 2.1.2	Difference between physical and chemical characteristics and phenomena
CHS 2.1.2.1	Sweet and smoky
CHS 2.1.2.2	Violet-blue smoke and the cure for goiter/ Iodine - physically and chemically
CHS 2.2	**Water seen chemically**
CHS 2.2.1	Composition of water
CHS 2.2.1.1	The water maker
CHS 2.2.2	Reaction of water and oxygen
CHS 2.2.2.1	Oxyhydrogen
CHS 2.2.3	Different Characteristics of Water Compounds with Hydrogen and Oxygen
CHS 2.2.3.1	Why an iceberg floats
CHS 2.2.3.2	The red geyser
CHS 2.2.3.3	Burning foam
CHS 2.2.4	Water as a pure substance and a solvent
CHS 2.2.4.1	Almost Invisible/ Solids in water
CHS 2.2.4.2	Similar things dissolve in each other/ Fluids in water
CHS 2.2.4.3	Gasoline pollution
CHS 2.2.5	Oxidation and reduction
CHS 2.2.5.1	Magic straw
CHS 2.2.5.2	Dust explosion
CHS 2.2.5.3	Carbon is very attractive
CHS 2.2.6	Reaction energy (exothermic and endothermic reactions)
CHS 2.2.6.1	Heat must be
CHS 2.2.6.2	Pocket hot water bottle
CHS 2.3	**Chemicals in daily life - it all depends on the dosage**
CHS 2.3.1	Dosage - concentration
CHS 2.3.1.1	Tracking down ppm
CHS 2.3.2	Working with chemicals in the home
CHS 2.3.2.1	Clean as a whistle
CHS 2.3.3	Working with flammable substances and solvents - fighting fires
CHS 2.3.2.1	Burn-off
CHS 2.3.3.2	Cold shock
CHS 2.3.3.3	Never use water
CHS 2.3.3.4	Eliminating oxygen: be careful of overpressure
CHS 2.4	**Acids and bases in daily life**
CHS 2.4.1	Testing for acidic and basic substances in water solutions using indicators
CHS 2.4.1.1	Kitchen chemistry
CHS 2.4.2	Measuring pH
CHS 2.4.2.1	An almost homeopathic dosage
CHS 2.4.3	Electrical conductivity of acids and bases
CHS 2.4.3.1	Acidic conductor
CHS 2.4.3.2	Basic conductor
CHS 2.4.4	Hydrochloric, sulphuric, nitric and acetic acid
CHS 2.4.4.1	Wait until dark
CHS 2.4.4.2	A thirsty gas
CHS 2.4.4.3	Not for x-rays
CHS 2.4.4.4	Divided water
CHS 2.4.4.5	Copper's enemy
CHS 2.4.5	Caustic soda solution, slaked lime, ammonia
CHS 2.4.5.1	A slippery matter
CHS 2.4.5.2	Careful of the cold pit
CHS 2.4.5.3	November fog
CHS 2.4.6	Neutralization
CHS 2.4.6.1	Plaster factory
CHS 2.5	**Air - the life substance**
CHS 2.5.1	Composition of air (nitrogen, oxygen)
CHS 2.5.1.1	Caution: lack of air!
CHS 2.5.1.2	Mofette
CHS 2.5.2	Combustion - flame - respiration
CHS 2.5.2.1	A glowing spot
CHS 2.5.2.2	Playing with fire
CHS 2.5.2.3	Take your breath away
CHS 2.5.3	Oxides as reaction products of substances containing oxygen
CHS 2.5.3.1	Red hot
CHS 2.5.3.2	What the Romans drank from
CHS 2.5.4	Pollutants in the air due to combustion



WE PAY A LOT OF ATTENTION TO SAFETY!

Butane burner:

1	**P2110-1A**	Butane burner
2	**P2110-1C**	Gas cartridge, pierced, or
3	**P2110-1V**	Gas cartridge with valve



Additional accessories:

4	**C6005-1B**	Washing bottle, 500 ml
5	**C7447-1B**	Water tank, plastic, 260x160x100 mm
6	**C7605-1S**	Protective googles with side protection

Not shown:

C7227-1B	Protective screen, 500x330 mm
C7225-1A	Protective ceramic plate in metal frame, 500x330 mm

Teclu burner: (flame temperature approx. 1300 °C)

	Article no.	Technical Data	Gas Type	Height	Weight
7	**C7410-1A**	Air regulator and needle valve	Natural gas	165 mm	285 g
	C7410-1B	Air regulator and needle valve	Propan	165 mm	285 g
8	**C7410-2A**	Air regulator, needle valve, igniting safety and economy flame	Natural gas	180 mm	745 g
	C7410-2B	Air regulator, needle valve, igniting safety and economy flame	Propane	180 mm	745 g

Other burners and accessories may be found on pages 216 and 217

CH9900-1A Chemical set for student experiments

Qty.	Item No.	Description
1	CH00430	Acetone, 500 ml
1	CH02060	Active carbon, powder, 250 g
1	CH03610	Ammonia solution, 25%, 1 l
1	CH04550	Ammonia molybdate solution, saturated, 50 ml
1	CH04700	Ammonia oxalate, 50 g
1	CH07200	Barium chloride, 100 g
1	CH08230	Benzine, 90°C-110°C, 1 l
1	CH08300	Benzoic acid, 50 g
1	CH09400	Lead (II) acetate, 50 g
1	CH09430	Lead (II) acetate paper, container
1	CH09600	Lead (II) nitrate, 100 g
1	CH09700	Lead (II) oxide, 250 g
1	CH09990	Burner alcohol, 1 l
1	CH11000	1 - Butanol (n-butyl alcohol), 250 ml
1	CH12200	Calcium carbide, ground, 100 g
1	CH12320	Calcium carbonate, precipitated, 1 kg
1	CH12400	Calcium chloride, ground, 100 g
1	CH12910	Calcium hydroxide, 500 g
1	CH13300	Calcium oxide, in pieces, 250 g
1	CH13410	Calcium sulphate-2-hydrate, precipitated, 1 kg
1	CH15610	Citric acid-1-hydrate, precipitated, 250 g
1	CH18270	Iron, coarse powder, 500 g
1	CH18600	Iron (III) chloride, anhydrous, 50 g
1	CH19000	Iron (III) oxide, 100 g
1	CH19200	Iron (II) sulphide, pieces, 250 g
1	CH19310	Eosine, yellowish, 25 g
1	CH19500	Acetic acid, 99-100%, 250 ml
1	CH19720	Ethanol solvent, 1 l
1	CH19910	Fehling's solution I, 250 ml
1	CH20010	Fehling's solution II, 250 ml
1	CH21010	Glass wool, 100 g
1	CH21210	Glycerine, 99%, 250 ml
1	CH22210	n-Hexane, 250 ml
1	C6805-3P	Indicator paper, pH 1-11, in container with scale
1	C6805-3N	Indicator paper, pH 1-11, 3 replacement rolls
1	CH24630	Potassium aluminium sulphate, 500 g
1	CH25210	Potassium chloride, 250 g
1	CH25600	Potassium dichromate, 50 g
1	CH26100	Potassium hexacyanoferrate (III), 50 g
1	CH26400	Potassium hydroxide, tabs, 250 g
1	CH26600	Potassium iodide, 25 g
1	CH26820	Potassium nitrate, 500 g
1	CH27000	Potassium permanganate, 100 g
1	CH27400	Potassium thiocyanate, 100 g
1	CH28000	Cobalt (II) chloride 6-hydrate, 25 g
1	CH28800	Copper, powder, 50 g
1	CH29110	Copper (II) chloride, 100 g
1	CH29510	Copper (II) oxide, 100 g
1	CH29710	Copper (II) sulphate, anhydrous, 250 g
1	CH29910	Litmus, 25 g
1	C6805-1N	Litmus paper, neutral, pad
1	CH31000	Magnesium ribbon, 25 g
1	CH31100	Magnesium, powder, 50 g
1	CH31500	Magnesium oxide, 50 g
1	CH32210	Manganese (IV) oxide, 500g
1	CH32700	Methanol, 250 ml
1	CH32910	Methyl blue, 25g

Qty.	Item No.	Description
1	CH35000	Sodium acetate 3-hydrate, 50 g
1	CH35620	Sodium carbonate, anhydrous (soda), 1 kg
1	CH35720	sodium chloride, 1 kg
1	CH36600	Sodium hydrogen carbonate, 250 g
1	CH36820	Sodium hydroxide, tabs, 1 kg
1	CH37620	Sodium sulphate 10-hydrate, 500g
1	CH37800	Sodium sulphite, 100 g
1	CH38010	Sodium thiosulphate 5-hydrate, 250 g
1	CH42400	Phenolphtalein, 5 g
1	CH42810	Phloroglucin, 25 g
1	CH44950	Quartz sand, 100 g
1	CH46610	Nitric acid, 65%, 500 ml
1	CH46770	Hydrochloric acid, concentrated, 25%, 2.5 l
1	CH47510	Sulphur, crystalline, 250 g
1	CH47870	Sulphuric acid, 95%-98%, 1 l
1	CH48610	Silver nitrate, 25 g
1	CH49210	Starch, soluble, 250 g
1	CH49420	Strontium nitrate, 250 g
1	CH53270	Vitamin C (ascorbic acid), 50 g
1	CH53510	Hydrogen peroxide, 30%, 1 l
1	CH54820	Zinc, ground, arsenic-free,1 kg
1	CH54900	Zinc, powder, 100 g
1	CH55110	Zinc chloride, dry, 250 g
1	CH55220	Zinc iodide, 25 g