Strengthening the Foundations Workbook

KS4 at Diss High School
Chemistry
Summer ‘catch up’

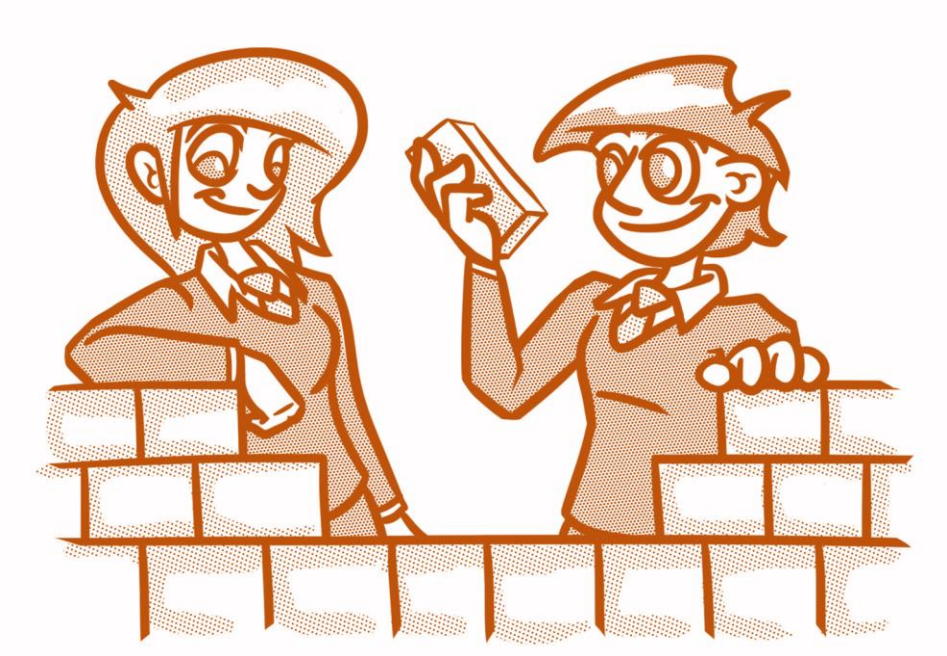
ANSWERS

Hello!

The answer for each question can be found in the appropriate bricks.

If the answer is too long for the brick then it will appear after the brick walls. There will be a letter or number in the brick to help you find the answer.

Good luck!



Protons = atomic number;
Electrons = number of protons
Neutrons = (mass number – atomic number)

D

E

C

Largest: 7.8×10^{2}
6.5×10^{-7}
6.54×10^{-8}
Smallest 7.7×10^{-9}

a) 6×10^{7}
b) 1.6×10^{9}

a) 38.743 dm^3
b) 576 cm^3
c) 756.294 dm^3

1 d.p. = 7.3
2 d.p. = 7.25
3 d.p. = 7.254
4 d.p. = 7.2539

73902000 g = 7.3902×10^{7} g
0.34 g = 3.4×10^{-1} g

602 000 000 000 000 000 000 000
This is a very large number

836.0
0.003873
9 740 000
0.003726

7 s.f.

6.7985×10^{4}
6.52×10^{-5}
5.678×10^{3}

5×10^{6}
3×10^{4}
2.572×10^{3}

1 s.f. = 80 000
2 s.f. = 80 000
3 s.f. = 79 600
4 s.f. = 79 610

790
36 000
0.00079

Mass = amount in moles x relative formula mass (molar mass)

Amount in moles = concentration x volume

I

B

$2HCl_{(aq)} + CuCO_{3(s)} \rightarrow CuCl_{2(aq)} + CO_{2(g)} + H_2O_{(l)}$

H

G

$NH_4NO_3 = 80$
$MgSO_4 = 120$
$Ca(Al_2Si_2)O_8 = 276$

$2NH_3 + H_2SO_4 \rightarrow (NH_4)_2SO_4$
$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$

F

Atom = O; no overall charge, smallest part of an element.
Molecule = O_2; two or more atoms bonded together.
Ion = O^{2-}; charged particle

$(NH_4)_2SO_4$ contains two nitrogen, eight hydrogen, one sulfur and four oxygen atoms.

$N_2 + 3H_2 \rightarrow 2NH_3$
$2Mg + O_2 \rightarrow 2MgO$
$CH_4 + 4O_2 \rightarrow 2H_2O + CO_2$

A

$H_2O = 18$
$CH_4 = 16$
$NH_3 = 17$
$HCl = 36.5$
$H_2SO_4 = 98$

H_2SO_4, contains two hydrogen, one sulfur and four oxygen atoms.

A

- Curve drawn through all the crosses on the graph
- As the mean temperature increases the time taken for the reaction to complete reduces. It is a non-linear relationship.
- The higher the temperature the more kinetic energy the particles have; there are more frequent successful collisions

B

- 0.65 mol ÷ 2 dm^3 = 0.32 mol/dm^3
- 2 mol ÷ 2 dm^3 = 1.00 mol/dm^3
- 2 mol ÷ 0.75 dm^3 = 2.67 mol/dm^3
- 100 cm^3 ÷ 1000 = 0.1 dm^3; 2mol ÷ 0.1 dm^3 = 20.00 mol/dm^3
- 1500 cm^3 ÷ 1000 = 1.5 dm^3; 0.5 mol HCl ÷ 1.5 dm^3 = 0.33 mol/dm^3

C

e.g.

- Chlorine
- Mass number = 35.5
- Atomic number = 17
- 17 protons
- 17 electrons
- Has isotopes

D

Draw a pencil line across the chromatography paper about 1 - 2 cm from the bottom.	Pencil, ruler, chromatography paper	Ruler drawn in pencil as it will not dissolve in solvent; inks will be placed on the line
Use a pipette or capillary tube to add small spots of each ink to the line on the paper.	Ink, capillary tube/ pipette	Capillary tube/ pipette adds a small amount of ink to ensure the spot is not too big; placed on the line so that the distance travelled by the spot can be measured
Place the paper into a container with a suitable solvent in the bottom.	Solvent, beaker	Inks dissolve in solvent and travel up the paper with the solvent; the inks need to dissolve in the solvent
Allow the solvent to move through the paper, but remove the chromatogram before it reaches the top.		The total distance travelled by the solvent needs to be measured to calculate the Rf value.
Allow the chromatogram to dry, then measure the distance travelled by each spot and by the solvent.	Ruler, (paper towel)	Rf value = distance travelled by spot ÷ distance travelled by solvent

E

Hydrogen – lighted splint placed into the gas, squeaky pop
Oxygen – Glowing splint placed into the gas, relights
Carbon dioxide – Gas bubbled through lime water, turns milky
Chlorine – Damp litmus paper placed in the gas, bleached/ turns white

F

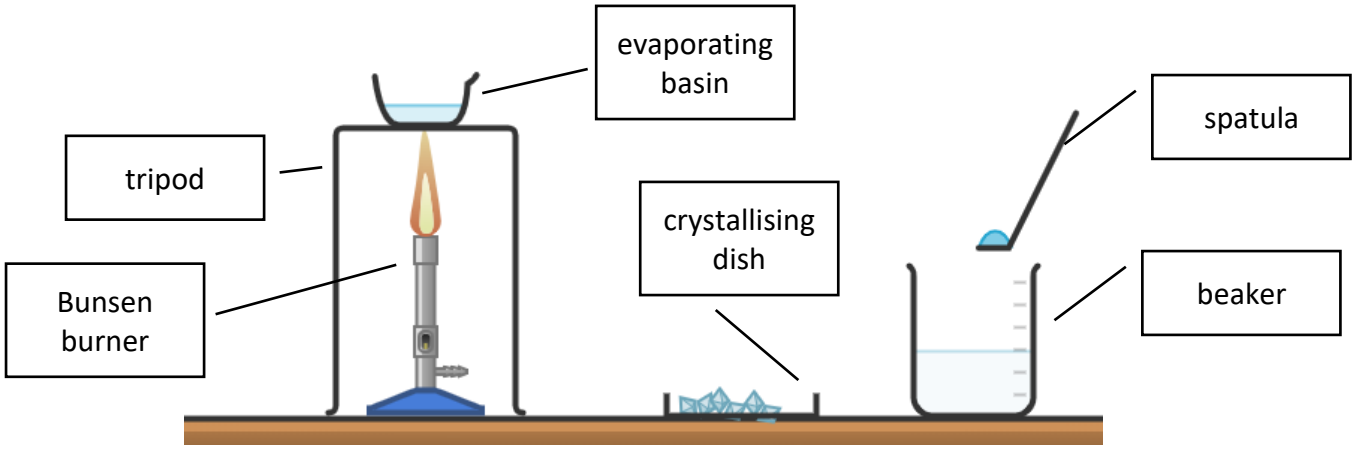
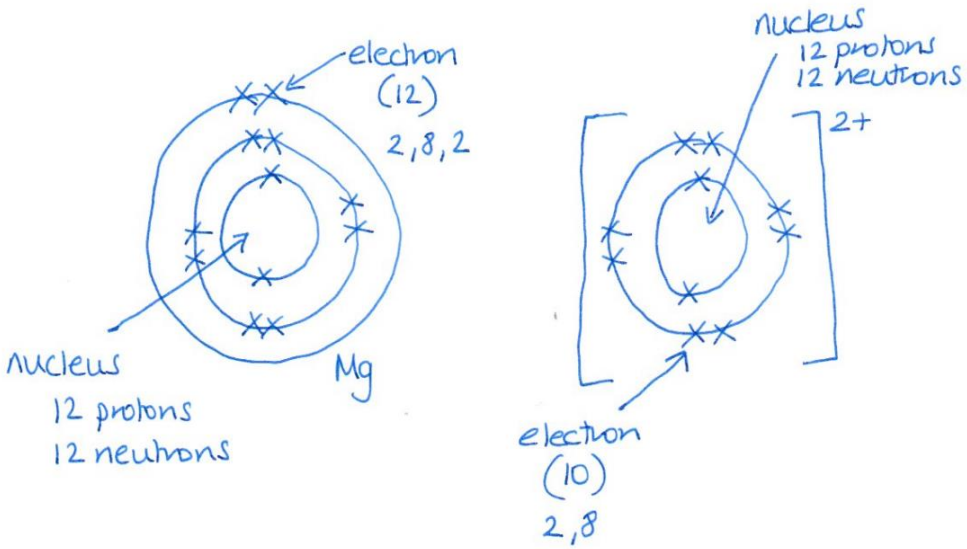


Diagram made in Chemix

G



H

Method should include the following:

- Mention of sulfuric acid and a suitable base e.g. copper oxide
- Measure sulfuric acid and place into a beaker, gently warm using Bunsen burner
- Add base to sulfuric acid until no more dissolves/ solid remains
- Filter the mixture to remove excess base
- Pour filtrate/ copper sulfate solution into an evaporating basin
- Heat until concentrated/ half evaporated
- Pour into a crystallising dish, allow to cool
- Dry crystals using filter paper/ oven/ warm place

I

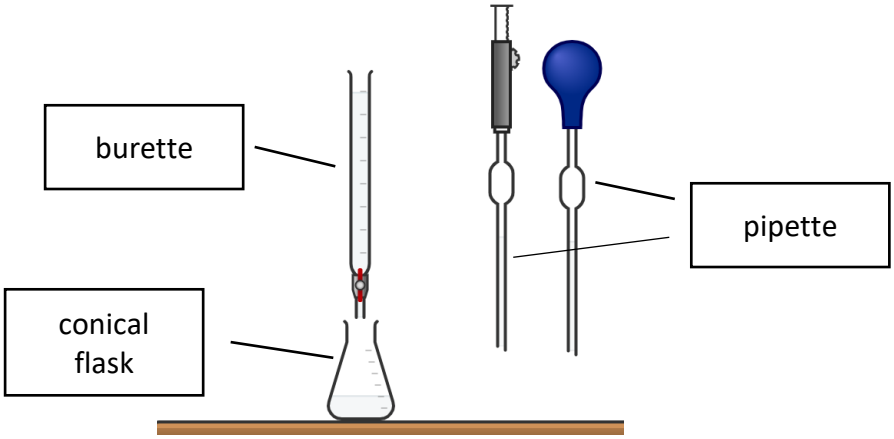


Diagram made in Chemix

Method should include the following:

- Mention of a suitable indicator, e.g. phenolphthalein or methyl orange, and the colour change
- Measure 25 cm^3 of the unknown and place into conical flask with a few drops of (named) indicator
- Place conical flask on white tile
- Fill burette with known concentration of known solution
- Read the level of solution in the burette (bottom of meniscus)
- Add the solution from the burette to the unknown solution until there is a colour change, swirl flask
- Add solution dropwise near the end point to identify exactly when the colour change of indicator takes place
- Read the level on the burette
- Repeat experiment until concordant results are reached/ until the results are close together