RISK ASSESSMENTS

You will need to carry out a full risk assessment for all of the practicals shown below. Information given here is just about apparatus, reagents and potential quantities aimed at groups of up to 30 students.

KS3 013 – Solubility of salt

For each pair:

- 2 conical flasks
- 100 cm^3 measuring cylinder
- small beakers of salt with spatula
- Filter finnel

General

- Filter paper
- Balances to take up to 300 g

KS3 018 – Solubility curve for potassium nitrate

For each pair:

- Test tube rack
- Bunsen, mat, tripod, gauze
- 250 cm^3 beaker

For each student

- 1 boiling tube of KNO_3 containing one of the masses shown below
- thermometer
- stirring rod

General

- 3 boiling tubes of each of the following masses of KNO_3 – the mass should be written on the boiling tube: 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 g

KS3 019 – Solubility of potassium bromide

For each pair:

- Boiling tube
- 250 cm^3 beaker
- Tripod, mat, gauze, Bunsen
- Thermometer (spirit filled)
- Stirring rod
- Small beaker of potassium bromide (with spatula)

KS3 020 – Dissolving jelly

For each student:

- 250 cm^3 beaker
- Stirring rod
- Thermometer (spirit filled)
- Stopwatch
- Small beaker of potassium bromide (with spatula)
- 50 ml measuring cylinder

General

- 60 x jelly cubes
- at least 2 kettles
- scissors

KS3 025 – Soluble or insoluble?

General

- 8 x small stoppered conical flasks of cyclohexane
- teat pipettes
- test tubes (2 per pair)
- test tube stoppers (2 per pair)
- beaker for used cyclohexane
- 4 x small beakers of "sugar" (sucrose) + spatula
- 4 x small beakers of "copper sulphate" (hydrated) + spatula
- 4 x small beakers of "wax" (paraffin wax shavings) + spatula
- 4 x small beakers of "chalk" (powder $CaCO_3$) + spatula
- test tube racks

Demo only

- one bottle of iodine crystals (demo only)
- 2 boiling tubes with stoppers
- sodium thiosulphate solution (for any iodine spills)

KS3 026 – Crystallisation

Per pair

- Boiling tube with 10 g of potassium nitrate
- Stirring rod
- Test tube rack
- Bunsen, mat, tripod, gauze
- 250 cm^3 beaker

KS3 030 – Chemical v Physical Changes 3

Reagents:

- Bottles of 2 mol dm^{-3} hydrochloric acid
- Magnesium ribbon (4 cm pieces)
- Sodium chloride in small beakers with spatulas
- Small beakers of vinegar
- Baking powder in small beakers with spatulas
- Copper carbonate in small beakers with spatulas (or could be placed ready in ignition tube for pupils)
- Wax shavings in small beakers with spatulas (or could be placed ready in ignition tube for pupils)

Per student / pair of students

- 3 test tubes
- test tube rack
- 2 ignition tubes
- ignition tube holder (e.g. wooden peg)
- test tube stopper
- Bunsen burner & mat

KS3 039 – Measuring density

- Several aluminium blocks of two different sizes (labelled A and B)
- Brass blocks the same size as one of the aluminium blocks
- Polystyrene blocks the same size as one of the aluminium blocks
- Rulers
- Balances (0.1 g)
- Small stones (that fit inside a measuring cylinder)
- Measuring cylinders (100 cm^3)
- Plastic syringe (10/20/50 cm^3 ish in size)
- High resolution balance (0.001 or 0.0001 g)
- Ethanol

KS3 041 – Expansion & contraction

- Ball and ring
- Tongs
- Bunsen burner & mat
- Flat bottomed, round flask full of coloured water, with bung with glass tubing in the top – the water level should be just above the bung.

- Bimetallic strip

KS3 042 – Pressure in gases

- Vacuum pump & can held with stand & clamp (collapsing can experiment)
- Suction pad (e.g. children's bath toy, plunger)
- Conical flask, hard boiled egg (with no shell), Bunsen, mat, tripod, gauze

KS3 050 – Reaction of elements with oxygen

Each reaction is done and then water and universal indicator can be added to the residue. Note that great caution is needed with some of these reactions (e.g. handling and reactions of phosohprus, adding water to the sodium residue, etc. – it is extremely important that CLEAPSS advice is carefully followed)

DEMOS

Sodium

- Gas jar of oxygen & deflagrating spoon
- Sodium
- Tile, tweezers, scalpel, filter paper
- Universal indicator
- Bunsen & mat

Phosphorus

- Gas jar of oxygen & deflagrating spoon (a round flask gives an even better effect)
- Phosphorus (plus beakers of water in case of any signs of smoking from phosphorus)
- Tweezers
- Universal indicator

Sulfur

- Gas jar of oxygen & deflagrating spoon
- Sulfur
- Tweezers
- Bunsen & mat
- Universal indicator

Calcium

- Gas jar of oxygen & deflagrating spoon
- Calcium
- Tweezers
- Bunsen & mat
- Universal indicator

PRACTICALS

Magnesium

- Tongs
- Magnesium ribbon
- Bunsen & mat
- Boiling tube
- Universal indicator

Copper

- Tongs

- Copper foil
- Bunsen & mat
- Boiling tube
- Universal indicator

Carbon

- Tongs
- Graphite or coal pieces
- Bunsen & mat
- Boiling tube
- Universal indicator

KS3 057 – Burning magnesium

- Balances (2 dp if possible)

Per group

- Bunsen, mat, tripod
- Pipe clay triangle (that will hold the crucibles)
- Crucibles with lid
- Tongs
- Magnesium ribbon (about 4 cm length)

KS3 058 – Candles in jars investigation

- Small candles that will stand up (tea-lights may work well)
- Range of glass jars in range of sizes (the more the better)
- Mats
- Stopwatches
- Measuring cylinders & jugs (a range of sizes)

KS3 059 – Concentration investigation

Suggested method is that students place 25 cm^3 of acid in a boiling tube and add a 1.5 cm strip of magnesium ribbon and time how long it takes to react (tube should be shaken during reaction). They should run the reactions simultaneously as the slowest may take up to 20 minutes.

- Hydrochloric acid (2.5, 2.0, 1.5, 1.0 & 0.5 mol/dm^3)
- Mg ribbon strips (2 cm long)
- Boiling tubes & racks
- Stopwatches
- 25 cm^3 measuring cylinders

KS3 060 – Using indicators

Suggestion is that initially students use litmus paper, litmus solution and phenolphthalein to determine whether substances are acidic, alkaline or neutral. In the next lesson they could use universal indicator to find pH and classify as very/slightly acid/alkaline.

- bottles of litmus
- bottles of phenolphthalein
- lots of blue litmus paper
- lots of red litmus paper
- 15 x white tiles
- 10 everyday substances in labelled conical flasks with stirring rod – possible substances are:
    - vinegar,
    - lemon juice,
    - washing up liquid,
    - soap,
    - washing soda,
    - bathroom cleaner,
    - liquid toilet cleaner,
    - washing powder,
    - shampoo,
    - lemonade,
    - distilled water
    - ethanol (please include this one)
- Some common lab acids and alkalis substances in labelled conical flasks with stirring rod (use lab reagents)
    - hydrochloric acid,
    - sulphuric acid,
    - ammonia,
    - sodium hydroxide

KS3 061 – Making red cabbage indicator

- red cabbage (fresh, not pickled)
- other suitable fruit (e.g. blueberries), vegetables (e.g. beetroot), flowers (e.g. bluebells but not English!)
- kettle
- pestles & mortars
- filter funnels
- filter paper
- boiling tubes
- test tubes
- rack for test & boiling tubes
- sodium hydroxide solution
- hydrochloric acid solution

KS3 067 – Testing indigestion tablets

- 4 brands of indigestion tablets
- pestles & mortars
- hydrochloric acid solution (2 mol/dm^3)
- teat pipettes
- conical flasks
- 25 cm^3 measuring cylinders
- Stirring rods
- Methyl orange indicator

KS3 072 – Metals + oxygen

Potassium as demo

- deflagrating spoon
- potassium
- tile, tweezers, scalpel, filter paper
- Bunsen & mat

Other metals as class practical

- Tongs
- Bunsen & mat
- Magnesium ribbon
- Copper foil
- Steel wool

KS3 073 – Metals + water

Potassium & lithium as demo

- potassium
- lithium
- tile, tweezers, scalpel, filter paper
- glass water trough
- test tube & bung (for testing gas formed from Li reaction)
- universal indicator (could be used to show solution formed is alkaline)

Other metals as class practical

- test tubes
- test tube rack
- Magnesium ribbon
- Copper foil
- Iron nails
- Calcium turnings

KS3 074 – Metals + acids

- test tubes
- test tube rack
- Magnesium ribbon
- Copper foil
- Iron nails
- zinc turnings
- hydrochloric acid (2 mol/dm^3)

KS3 075 – Displacement reactions

- spotting tiles
- labelled beaker of Cu strips
- labelled beaker of Mg ribbon
- labelled beaker of Zn strips
- labelled beaker of lead strips (labelled metal X)
- labelled beaker of Fe nails
- labelled flask of 0. 5 M $CuSO_4$ (with pipette)
- labelled flask of 0.2 M $Mg(NO_3)_2$ (with pipette)
- labelled flask of 0.2 M $Zn(NO_3)_2$ (with pipette)
- labelled flask of aq $Pb(NO_3)_2$ (with pipette) (labelled X nitrate)
- labelled flask of 0.2 M $FeSO_4$ (with pipette)
- washing up bowl for waste metals

KS3 083 – Looking at elements

Each of the following elements with 2 copies of each one's information card (Chemsheets KS3 084)

- bottle of sodium with tweezers, scalpel, tile and filter paper (demo only)
- clear bottle of mercury
- beaker of sulphur powder
- gas jar of air (labelled "oxygen")
- beaker of magnesium ribbon
- copper foil
- gas jar of air (labelled "hydrogen")
- gas jar of chlorine in fume cupboard
- gas jar of air (labelled "argon")
- sticks of graphite
- block of aluminium

KS3 093 – Comparing elements & compounds

Each of the following elements / compounds with a copy of each one's information card (Chemsheets KS3 094)

- *Station 1 (teacher to show them this):* Sodium chloride, sodium, chlorine
- *Station 2:* Water, hydrogen, oxygen
- *Station 3:* Magnesium oxide, magnesium, oxygen
- *Station 4:* Copper oxide, copper, oxygen
- *Station 5:* Copper sulfate, copper, sulfur, oxygen
- *Station 6:* Sugar, carbon, hydrogen, oxygen
- *Station 7:* Calcium carbonate, calcium, carbon, oxygen

KS3 106 – Chromatography

- 250 ml beakers
- wash bottles
- chromatography paper (cut out filter paper stapled to a spill)
- Selection of felt tips, etc. (please include some non-water soluble ones)
- mortar and pestles
- bottles of propanone
- teat pipettes
- beaker of sand
- melting point tubes
- green leaves (grass may do)

KS3 107 – Separating salt and sulfur

- mixture of salt and sulfur
- conical flasks (2 per group/pupil)
- stirring rod
- filter funnels
- filter paper
- Bunsen, mat, tripod
- Evaporating basin