Appendix 5

GCSE Sciences: Equipment list

The list below is for all core practicals in GCSE Combined Science and Separate sciences. The separate science equipment is draft, and will be updated with a final version on the Edexcel website soon.

Biology

Spec statement	Equipment needed (per group)
1.6 Investigate biological specimens using microscopes, including magnification calculations and labelled scientific drawings from observations	Microscope and light source beaker of 1% Virkon stain (e.g. methylene blue, iodine solution) paper towels plant material (e.g. onion, rhubarb) pipette eye protection sterile (autoclaved) wooden spatula/tongue depressor gloves plain glass microscope slide coverslip toothpick/cocktail stick [Note: equipment listed at the top is for a group and that listed after the break is for an individual (making a slide)]
1.10 Investigate the effect of pH on enzyme activity	test tube soluble starch 1% amylase solution (or 0.5% pancreatin solution) water bath 5 cm^3 syringe or pipette, beaker eye protection 0.01 mol dm^{-3} iodine solution, well tray (spotting tile). hypochlorite (bleach) solution or 1% Virkon solution small beaker or other container for collecting saliva buffer solutions at set pH (using 0.2 mol dm^{-3} Na_2HPO_4 and 0.1 mol dm^{-3} citric acid or adding dilute hydrochloric acid and sodium hydrogen carbonate solution (prior to adding the amylase)
1.13B Investigate the use of chemical reagents to identify starch, reducing sugars, proteins and fats	food samples: powdered potato, full and/or low fat powdered milk, whey (protein) powder, powdered egg white (use commercially available albumen), powdered glucose; water, measuring cylinder, spatula, powdered foods, paper towels, test tubes, racks and bungs, stirrer, iodine solution (1 g iodine in 100 cm3 0.5 mol dm3 potassium iodide solution) in dropper bottle, Benedict's solution

Spec statement	Equipment needed (per group)
DRAFT	(prepared according to CLEAPSS Recipe card 11 [qualitative] or 12 [for quantitative measurements], Biuret solution (prepared according to CLEAPSS Recipe Sheet 15) in dropper bottle, Sudan III stain (dissolve 0.5 g dye in 70 cm3 ethanol [highly flammable] and 30 cm3 water, using a warm water bath and filter) in dropper bottle, water bath at 70 °C. (optional) icing sugar, hydrochloric acid, sodium hydroxide solution, water bath at 100 °C.
1.16 Investigate osmosis in potatoes	4 Potato strips four boiling tubes and rack (or beakers), waterproof pen, 550 g/dm^3 sucrose solution forceps agar cubes containing sodium hydroxide and universal indicator or phenolphthalein (one cube each of side lengths 2 cm, 1 cm and 0.5 cm or an agar block large enough for students to cut their own cubes), 20 cm^3 0.1 mol/dm^3 hydrochloric acid, 100 cm^3 beaker forceps white tile knife stopclock or watch eye protection
5.18B Investigate the effects of antiseptics, antibiotics or plant extracts on microbial cultures DRAFT	Petri dish with lid, of agar covered with a bacterial lawn (e.g. E.coli or Staphylococcus albus) prepared antibiotic discs in different concentrations sticky tape marker pen sterile forceps ethanol (IDA) incubator
6.5 Investigate the effect of light intensity on the rate of photosynthesis	pre-prepared algal (*Scenedesmus quadricauda*) balls (in a beaker of fresh distilled water) hydrogen carbonate indicator solution (cherry red colour (pH 8.4) and equilibrated with air) 5 - 8 small (bijou) bottles with caps (pre-washed in distilled water) metre rule lamp (with high light intensity, circa. 80 W incandescent or equivalent CFL/LED) spatula (clean and washed in distilled water) kitchen foil access to a display of bottles showing the colours of the hydrogen carbonate at different pH
8.11 Investigate respiration in living organisms	small organisms (e.g. meal worms) 2 boiling tubes (containing 2 spatulas of soda lime held in place at the bottom of the tube with a plug of cotton wool) (1 tube for test, 1 for

Spec statement	Equipment needed (per group)
	control) cored bung(s) (to fit into boiling tube) L-shaped capillary tube(s) (to fit into cored bung) ruler eye protection plastic 'weighing boat' beaker of water containing strongly coloured (e.g. with food dye) solution access to water baths at different temperatures, with boiling tube racks
9.5 Investigate the relationship between organisms and their environment	quadrat (e.g. 1 metre square) long tape measure (at least 20 m) with securing pegs equipment for measuring appropriate physical factors (e.g. thermometer, light meter, data recorder with light, moisture or temperature sensors, soil pH meter) clipboards recording sheets

Chemistry

Spec statement	Equipment needed (per group)
2.11 Investigate the composition of inks using simple distillation and paper chromatography	250 cm^3 beaker chromatography paper a splint or pencil or glass rod/paper clips four different black felt pens or water-soluble marker pens labelled A–D selection of different coloured marker pens or felt-tip pens selection of pens with 'permanent' (non-water-soluble) inks solvent that will dissolve the permanent ink (for biro ink a mixture of butan-1-ol, ethanol, water (3:1:1 by volume) 880-ammonia ethanol, propanone or propan-2-ol eye protection a conical flask with side-arm, (an alternative is to use a two-hole bung with a thermometer and delivery tube) rubber bung with thermometer delivery tube test tube beaker (250 or 400 cm^3) crushed ice Bunsen burner tripod gauze heat-resistant mat ink antibumping granules
3.17 Investigate the preparation of copper sulfate crystals	eye protection 250 cm^3 conical flask 100 cm^3 beaker Bunsen burner gauze tripod stand heat mat Petri dish or watch glass 100 cm^3 measuring cylinder evaporating basin spatula stirring rod filter funnel filter paper tongs water bath 1 mol dm^{-3} sulfuric acid copper(II) oxide
3.6 Investigate the change in pH on adding powdered calcium	eye protection 100 cm^3 beaker 50 cm^3 measuring cylinder

Spec statement	Equipment needed (per group)
hydroxide or calcium oxide to a fixed volume of dilute hydrochloric acid	±0.1 g balance spatula stirring rod white tile universal indicator paper pH colour chart dilute hydrochloric acid calcium hydroxide powder
3.31 Investigate the electrolysis of copper sulfate solution	emery paper low voltage supply (0-12 V) ammeter (0-1 A) variable resistor connecting leads crocodile clips 100 cm^3 beaker stop watch/clock 2 graphite rods 2 strips of copper foil about 2 cm wide and long enough to reach the bottom of the beaker copper sulfate solution (about 50 cm^3, 0.5 mol dm^{-3}) access to a beaker of propanone (about 50 cm^3) access to a balance (at least 2 d.p.)
5.9C Carry out an accurate acid-alkali titration, using burette, pipette and a suitable indicator DRAFT	Each group needs: burette burette stand or retort stand with burette clamp plastic funnel to fit in top of burette 25.0 cm3 pipette pipette filler conical flask white tile methyl orange or phenolphthalein indicator (few drops) hydrochloric acid (about 100 cm3, 0.1 mol dm-3) sodium hydroxide solution (about 100 cm3, 0.1 mol dm-3) access to distilled/de-ionised water
7.1 Investigate the effects of changing the conditions of a reaction on the rates of chemical reactions etc..	Eye protection, large sized marble chips, small sized marble chips, 0.5 mol dm^{-3} hydrochloric acid 250 cm^3 conical flask,100 cm^3 measuring cylinder or gas syringe, 0.1 mol dm^{-3} sodium thiosulfate, 1.0 mol dm^{-3}, 50 cm^3 measuring cylinder, stop clock or stopwatch, 10 cm^3 measuring cylinder thermometer water bath,
9.6C Identify the ions in unknown salts, using the tests for the specified	Eye protection, Bunsen burner, heat-resistant mat, test tubes, test tube rack, test tube holder, flame test loops (or wooden splints soaked in water), spatula, dropping pipettes, 0.1 mol dm–3 barium

Spec statement	Equipment needed (per group)
cations and anions in 9.2C, 9.3C, 9.4C, 9.5C DRAFT	chloride solution, 0.4 mol dm–3 hydrochloric acid, 2 mol dm–3 hydrochloric acid (if using flame test loops), 0.05 mol dm–3 silver nitrate solution, 0.4 mol dm–3 nitric acid, 0.4 mol dm–3 sodium hydroxide solution, red litmus paper, distilled water or deionised water. Solid substances for flame tests and carbonate test, e.g. lithium chloride, sodium chloride, potassium chloride, calcium chloride, copper(II) chloride, calcium carbonate. Approx. 0.2 mol dm–3 solutions for precipitate tests, e.g. sodium chloride, potassium bromide, potassium iodide, aluminium sulfate, calcium chloride, copper(II) sulfate, iron(II) sulfate, iron(III) sulfate, ammonium chloride.
9.28C Investigate the temperature rise produced in a known mass of water by the combustion of the alcohols ethanol, propanol, butanol and pentanol DRAFT	Eye protection, alcohol burners, 150 cm^3 conical flasks, thermometers (-10 to 110 °C, retort stands and clamps, electronic balance +/- 0.01 g, 100 cm^3 measuring cylinders, lighters or matches, methanol, ethanol, propan-1-ol, butan-1-ol, pentan-1-ol.

Physics

Spec statement	Equipment list
2.19 Investigate the relationship between force, mass and acceleration by varying the masses added to trolley	trolley, ramp, blocks, pulley, string, stacking masses, mass hanger, sticky tack, 2 light gates, 2 clamps and stands, access to balance, datalogger
4.17 Investigate the suitability of equipment to measure the speed, frequency and wavelength of a wave in a solid and a fluid	Speed of waves on water: ripple tank (ideally with beaches to prevent reflections), stopwatch, ruler, digital camera Speed of sound in solid: 2 clamps and stands; 2 rubber bands; long metal rod (up to a metre long); metre rule; hammer; smartphone with frequency app Speed of sound in air: 2 microphones, datalogger, connecting wires, two blocks of wood

5.9 Investigate refraction in rectangular glass blocks in terms of the interaction of electromagnetic [PJ1] waves with matter.	Ray box with single slit, power supply, rectangular glass block, protractor.
5.19P Investigate how the nature of a surface affects the amount of thermal energy radiated or absorbed DRAFT	4 beakers or test tubes; coloured paper or foil to cover at least 3 tubes, or 3 of the tubes painted different colours and card or foil to make lids; 4 thermometers; stopclock; hot water.
10.17 Construct electrical circuits to: a investigate the relationship between potential difference, current and resistance for a resistor and a filament lamp b test series and parallel circuits using resistors and filament lamps	Power supply, ammeters, voltmeters, resistors, filament lamps, connecting wires
14.3 Investigate the densities of solid and liquids	Samples of various materials (e.g. materials kit), displacement can, measuring cylinder, access to balance, beakers
14.11 Investigate the properties of water by determining the specific heat capacity of water and obtaining a temperature-time graph for melting ice	Ice, thermometer, beaker, tripod, gauze, Bunsen burner, kettle, polystyrene cup, balance, electric immersion heater, joulemeter (or ammeter and voltmeter), stopclock
15.6 Investigate the extension and work done when applying forces to a spring	Spring, stand with 2 clamps, ruler, stacking masses