

# ASSESSMENT MATERIALS KIT

MATERIALS LIST - 9781418326142

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# EVALUATE ATOMIC STRUCTURE WITH FLAME TESTS

## Materials Included in Kit (for 10 groups of students)

- Calcium chloride,  $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$ , 50 g
- Potassium chloride,  $\text{KCl}$ , 50 g
- Sodium chloride,  $\text{NaCl}$ , 50 g
- Strontium chloride,  $\text{SrCl}_2 \cdot 6\text{H}_2\text{O}$ , 50 g
- Avery labels, sheet of 80
- Bingo chips, red, blue, yellow, and green, 120 each
- Construction paper, white, 15 sheets
- Energy level labels
- Filter paper, package of 60
- Glue stick
- Wooden splints, package of 100

## Additional Materials Required (*per student group*)

- Beakers, 250 mL, 2
  - Laboratory burner
  - Watch glasses or weighing dishes, 5
  - Water, distilled or deionized, 250 mL
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# GRAVIMETRIC ANALYSIS OF PERIODIC TRENDS

## Materials Included in Kit *(for 10 groups of students)*

- Methanol, CH<sub>3</sub>OH, 2 L
- Sodium bromide, NaBr, 200 g
- Sodium chloride, NaCl, 120 g
- Sodium iodide, NaI, 200 g

## Additional Materials Required *(per student group)*

- Balance, 0.01 g precision (shared)
- Beaker, 100 mL, 3
- Büchner flask, 250 mL
- Büchner funnel, 5.5 cm
- Büchner funnel rubber stopper, size 6
- Filter paper quantitative, 5.5 cm, 3 pieces
- Graduated cylinder, 50 mL
- Spatula
- Magnetic stir bar
- Magnetic stir plate
- Vacuum filtration apparatus setup
- Watch glass, 75 mm, 3

# QUALITATIVE ANALYSIS AND CHEMICAL BONDING

## Materials Included in Kit *(for 10 groups of students)*

- The “Unknowns”
  - Adipic acid,  $\text{HO}_2\text{C}(\text{CH}_2)_4\text{CO}_2\text{H}$ , 20 g
  - Aluminum granules, Al, 20 g
  - Calcium carbonate, powder,  $\text{CaCO}_3$ , 25 g
  - Dodecyl alcohol,  $\text{CH}_3(\text{CH}_2)_{11}\text{OH}$ , 20 g
  - Glycine,  $\text{NH}_2\text{CH}_2\text{CO}_2\text{H}$ , 20 g
  - Graphite, C, 20 g
  - Iron oxide,  $\text{Fe}_2\text{O}_3$ , 20 g
  - Iron powder, Fe, 20 g
  - Potassium nitrate,  $\text{KNO}_3$ , 20 g
  - Salicylic acid, 2- $\text{HOC}_6\text{H}_4\text{COOH}$ , 20 g
  - Silicon lumps, Si, 20 g
  - Sodium carbonate, anhydrous,  $\text{Na}_2\text{CO}_3$ , 20 g
- Copper(II) sulfate, pentahydrate  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ , 25g
- Dextrose monohydrate,  $\text{C}_6\text{H}_{12}\text{O}_6 \cdot \text{H}_2\text{O}$ , 20 g
- Ethyl alcohol,  $\text{CH}_3\text{CH}_2\text{OH}$ , 250 mL
- Hexane,  $\text{C}_6\text{H}_{14}$ , 250 mL
- Hydrochloric acid solution, HCl, 0.1 M, 250 mL
- Paraffin wax, 20 g
- Sodium hydroxide solution, NaOH, 0.1 M, 250 mL
- Zinc, Zn, 20 g
- Aluminum dish, 12
- Test tubes, 60

## Additional Materials Required *(per student group)*

- Water, distilled or deionized, 20 mL
  - Beaker, 100-mL
  - Bunsen burner
  - Conductivity meter or tester
  - Hot plate
  - pH paper
  - Stirring rod
  - Test tube holder
  - Test tube rack
  - Thermometer
  - Tongs
-

# ROAD DEICERS

## Materials Included in Kit *(for 10 groups of students)*

- Calcium chloride,  $\text{CaCl}_2$ , 120 g
- Silicon dioxide,  $\text{SiO}_2$ , 200 g
- Sodium chloride,  $\text{NaCl}$ , 120 g

## Additional Materials Required *(per student group)*

- Balance, 0.1 g precision
  - Beaker, 50 mL, 4
  - Beaker, 600 mL
  - Ice, crushed, 200 g
  - Stopwatch
  - Thermometer
-

# CHEMICAL QUANTITIES

## Materials Included in Kit *(for 10 groups of students)*

- Basic copper carbonate, 50 g
- Copper(II) sulfate, pentahydrate,  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ , 25 g
- Hydrochloric acid solution, HCl, 2 M, 300 mL
- Sulfuric acid solution,  $\text{H}_2\text{SO}_4$ , 0.5 M, 120 mL
- Pipets, Beral-type, 40
- Weigh dishes, 20

## Additional Materials Required *(per student group)*

- Water, distilled or deionized
  - Balance, 0.01-g precision
  - Erlenmeyer flask, 125-mL
  - Graduated cylinder, 10-mL
  - Graduated cylinder, 25-mL
  - Marker, permanent
  - Paper towels
  - Reaction plate
  - Test tube rack
  - Test tubes, 13 × 100 mm, 7
  - White paper, 8.5" × 11", 2 sheets
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# IDENTIFY EVIDENCE OF CHEMICAL REACTIONS

## Materials Included in Kit *(for 10 groups of students)*

- Acetic acid,  $\text{CH}_3\text{COOH}$ , 2 M, 1 L
- Calcium carbonate, 50 g
- Sodium bicarbonate,  $\text{NaHCO}_3$ , 50 g
- Sodium carbonate, 50 g
- Sodium chloride, 40
- Sucrose, 40 g
- Balloons, 12", 60
- Funnel, powder, small
- Weighing dishes, 50

## Additional Materials Required *(per student group)*

- Balance (0.01-g precision)
- Erlenmeyer flask, 125 mL, 5
- Graduated cylinder, 25 mL
- Permanent marker
- Spatula



# THE STOICHIOMETRY OF FILLING A BALLOON

## Materials Included in Kit *(for 10 groups of students)*

- Acetic acid,  $\text{CH}_3\text{COOH}$ , 2 M, 750 mL
- Sodium bicarbonate,  $\text{NaHCO}_3$ , 170 g
- Balloons, 80
- Weighing dishes, 60

## Additional Materials Required *(per student group)*

- Balance, 0.01 g precision
  - Erlenmeyer flasks, 125 mL, 6
  - Graduated cylinder, 25 or 50 mL
  - Permanent marker
  - Powder funnel
  - Spatula
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# ENTHALPY OF A NEUTRALIZATION REACTION

## Materials Included in Kit *(for 10 groups of students)*

- Hydrochloric acid solution, 1.0 M, HCl, 1600 mL
- Sodium hydroxide solution, 1.0 M, NaOH, 800 mL
- Sodium hydroxide flakes, NaOH, 100 g
- Polystyrene cups, package of 30
- Weighing dishes, 20

## Additional Materials Required *(per student group)*

- Balance, 0.01 g precision
  - Beaker, 400 mL
  - Graduated cylinder, 2, 50 mL
  - Spatula or scoop
  - Thermometer
  - Water, distilled or deionized
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# MICROHABITAT IN A BOTTLE

## **Materials Included in Kit** (for 10 groups of students)

- Aquarium gravel, 2.3 kg
- Bottles, 1 liter, 10
- Caps, 15
- Grass seed, bag, 2
- Soil, 8 lb bag
- Screens, nylon, 4 in. diameter, 10
- Wood skewers, bag of 100

## **Additional Materials Required** (*per student group*)

- Funnel
  - Light source
-

# CLIMATE CHANGE AND THE CARBON CYCLE

## Materials Included in Kit *(for 10 groups of students)*

- Bromothymol blue (BTB) indicator solution, 0.04% aqueous, 100 mL
- Corks, size #3, package of 100
- Pipets, Beral-type, graduated, package of 20
- Straws, package of 50
- Test tubes, 16 mm×125 mm, 50

## Additional Materials Required *(per student group)*

- *Elodea* sprigs, 4
  - Water, tap
  - Beaker, 400 mL
  - Hot plate
  - Heat-resistant gloves or mittens
  - Lamp, white light
  - pH meter
  - pH paper (optional)
  - Spatula or scoop
  - Test tube rack
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# REACTION RATES AND EQUILIBRIUM

## Materials Included in Kit *(for 10 groups of students)*

- Laboratory detergent, 200 g
- Hydrogen peroxide, H<sub>2</sub>O<sub>2</sub>, 10% solution, 840 mL
- Hydrogen peroxide, H<sub>2</sub>O<sub>2</sub>, 30% solution, 140 mL
- Sodium acetate trihydrate, 250 g
- Sodium iodide solution, NaI, 2 M, 105 mL

## Additional Materials Required *(per student group)*

- Distilled water
- Tap water
- Beaker, 50 mL
- Beaker, 250 mL, 2
- Ice
- Graduated cylinders, 10 mL, 3
- Graduated cylinders, 50 mL, 3
- Graduated cylinders, 100 mL, 3
- Hot plate
- Plastic demo tray or tub
- Test tubes, 15 mL
- Thermometer
- Timer
- Wax pencils

# QUANTITATIVE ANALYSIS OF ACID RAIN

## Materials Included in Kit *(for 10 groups of students)*

- Adipic acid, 20 g
- Nitric acid, 50 mL
- Phenolphthalein indicator solution, 100 mL
- Sodium hydroxide solution, NaOH, 0.005 M, 100 mL
- Sulfuric acid, 20 mL

## Additional Materials Required *(per student group)*

- Buret, 50 mL
  - Buret clamp
  - Beaker, 50 mL, 3
  - Erlenmeyer flask, 250 mL, 3
  - Graduated cylinder, 50 mL
  - pH probe
  - Support stand
  - Water, distilled or deionized
-

# CALCIUM CARBONATE AND SHELL PRODUCTION

## Materials Included in Kit *(for 10 groups of students)*

- Calcium carbonate (marble chips)  $\text{CaCO}_3$ , 70 g
- Hydrochloric acid solution, 6 M, 250 mL
- Hydrochloric acid solution, 2 M, 200 mL
- Petroleum jelly, foilpacks, 10
- Gas collection apparatuses, 10
  - Syringe, 60 mL
  - Syringe adapter
  - Stopper, one-hole (to fit flask)

## Additional Materials Required *(per student group)*

- Balance, 0.001 g precision
  - Clamp, single, buret
  - Erlenmeyer flasks, 125 mL, 3
  - Silicone grease or petroleum jelly (optional)
  - Support stand
  - Timer or stopwatch
  - Wash bottle
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# CARTESIAN DIVERS

## **Materials Included in Kit** *(for 10 groups of students)*

- Hex nuts, 100
- Pipette, Beral-type, disposable, 100
- Plastic soda bottle, 1-L

## **Additional Materials Required** *(per student group)*

- Beaker, 600 mL
  - Paper towel
  - Tap water
-



# BATTERY CHALLENGE

## Materials Included in Kit *(for 10 groups of students)*

### Metal samples

- Copper foil, Cu(s), 3" × 12" sheet
- Iron nails, Fe(s), 12
- Lead foil, Pb(s), 3" × 12" sheet
- Magnesium, ribbon, Mg(s), 15
- Silver foil, Ag(s), 5 g
- Zinc strips, Zn(s), 5" × 1/2", 5

### Other materials

- Chromatography sheet, 20 x 10 cm, pk/15
- Alligator clip leads, red, 10
- Alligator clip leads, black, 10
- Pipets, beral-type, 120

### *Included for possible extension*

- Charcoal, 500 g
- Sodium chloride solution, saturated, 500 mL

### Metal ion aqueous solutions

- Copper(II) nitrate, Cu(NO<sub>3</sub>)<sub>2</sub>, 1.0 M, 100 mL
- Iron(III) nitrate, Fe(NO<sub>3</sub>)<sub>3</sub>, 1.0 M, 100 mL
- Lead nitrate solution [Lead(II) nitrate], Pb(NO<sub>3</sub>)<sub>2</sub>, 1.0 M, 100 mL
- Magnesium nitrate solution, Mg(NO<sub>3</sub>)<sub>2</sub>, 1.0 M, 100 mL
- Potassium nitrate solution, KNO<sub>3</sub>, 1.0 M, 200 mL
- Silver nitrate solution, AgNO<sub>3</sub>, 1.0 M, 100 mL
- Sodium chloride solution, NaCl, 1.0 M, 150 mL
- Zinc nitrate solution, Zn(NO<sub>3</sub>)<sub>2</sub>, 1.0 M, 100 mL

## Additional Materials Required *(per student group)*

- Beaker, 50 mL
  - Sandpaper or steel wool
  - Filter paper
  - Reaction plate, 24-well
  - Voltmeter
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# PREPARE AND CHARACTERIZE BIODIESEL

## Materials Included in Kit *(for 10 groups of students)*

- Canola or corn oil, 1000 mL
- Methyl alcohol, CH<sub>3</sub>OH, 200 mL
- Potassium hydroxide, KOH, 5 g

## Additional Materials Required *(per student group)*

- Alcohol burner with wick and cap, empty
  - Aluminum soda can, with opening tab, 355 mL
  - Balance, 0.01 g precision
  - Beaker, 50 mL
  - Graduated cylinders, 25 and 50 mL
  - Erlenmeyer flask and rubber stopper, 125 mL
  - Lighter
  - Hot plate or hot water bath
  - Magnetic stirrer and stir bar
  - Ring clamp and support stand
  - Separatory funnel, 125 mL
  - Stirring rod
  - Thermometer, digital
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# NATURAL RADIATION

## **Materials Included in Kit** *(for 10 groups of students)*

- Metric ruler, transparent, 12", 10
- Potassium chloride, KCl, 500 g
- Watch glasses, 10

## **Additional Materials Required** *(per student group)*

- Balance, 0.01 g precision
  - Clamp
  - Radiation monitor
  - Spatula
  - Support stand
-

# MAKE THE CHEMISTRY LAB GREENER

## Materials Included *(for 10 groups of students)*

- Beeswax, 100 g
- Bismuth nitrate solution, 0.1 M, 100 mL
- Copper(II) sulfate solution,  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ , 0.1 M, 75 mL
- Hydrochloric acid, HCl, 3 M, 180 mL
- Zinc strips, 5" × ½" × 0.01", 10
- Candles, tea light, 10

## Additional Materials Required *(per student group)*

- Water, distilled or deionized
  - Lip balm
  - Balance, 0.001 g precision
  - Beakers, 50 mL and 200 mL
  - Cardboard piece, or clipboard, 1
  - Paper, without any special coating
  - Pipets, Beral-type, 3
  - Ruler
  - Scissors
  - Test tubes, 13 mm × 100 mm, 5
  - Test tube rack
  - Tweezers (optional)
  - Wax pencil
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