

By the end of Spring 1 you will know:

Neutralisation and the pH Scale

1. What is the pH scale?
2. What pH is a strong acid?
3. What pH is a weak acid?
4. Name some acids and if they are strong or weak.
5. What pH is neutral?
6. Name a neutral substance
7. What pH is a weak alkali?
8. What pH is a strong alkali?
9. Name some alkalis and if they are strong or weak.
10. What ion do acids produce?
11. What ion do alkalis produce?
12. What is the equation for neutralisation?

Strong and Weak Acids (Higher Only)

1. Define strong acid.
2. Give 3 examples of a strong acid.
3. Define weak acid.
4. Give 2 examples of a weak acid.
5. What is the relationship between pH unit and hydrogen ion concentration?

Making Salts

1. State the general word equation for the reaction of a metal and an acid
2. Define salt
3. What is the ending of the salt made in a reaction using:
 - a. Hydrochloric acid
 - b. Sulfuric acid
 - c. Nitric acid
4. State the general word equation when an acid reacts with an alkali.
5. State the general word equation when an acid reacts with a base.
6. Define insoluble
7. State the difference between an alkali and a base.
8. Where are the positive ions found in the reactants?
9. State how to separate an insoluble salt from the solution.
10. State the general word equation when an acid reacts with a carbonate.

11. State how to separate a soluble salt from the liquid.

Reacting Masses & Limiting Reactants (Higher Only)

1. What is a limiting reactant?
2. How can an equation be balanced from knowing the number of moles of reactants/products?
3. Why is it important to use one of the two reactants in excess in a chemical reaction?

The Reactivity Series and displacement

1. What is made when metals react with oxygen?
2. Name this type of reaction.
3. How are unreactive metals found in the Earth?
4. What is an ore?
5. How is metal less reactive than carbon extracted?
6. Name the type of reaction to remove oxygen from a metal compound.
7. Define displacement
8. Define oxidation and reduction in terms of electron movement (HT)

Extracting Metals

1. How are metals more reactive than carbon extracted?

Electrolysis

1. Why do molten/dissolved ionic compounds conduct electricity?
2. Define electrolysis
3. Define electrolyte
4. Name the electrodes and their charges.
5. State what forms at each electrode.
6. Where does the positively charged ion move to?
7. Where does the negatively charged ion move to?
8. What is reduction?
9. What is oxidation?
10. State the products at each electrode for the electrolysis of zinc chloride
11. State the products at each electrode for the electrolysis of lead bromide.
12. When is hydrogen produced at the cathode?
13. When is oxygen produced at the anode?
14. If a metal chloride is being electrolysed, what gas will be produced?

15. What gas is produced when a metal sulfate is electrolysed?

Electrolysis of Aluminium

1. What is bauxite?
2. What are the products of the electrolysis of aluminium oxide?
3. Why is cryolite used in the extraction of Aluminium?
4. What are the electrodes made of?
5. Why is electrolysis an expensive extraction method?

Electrolysis of brine

1. Name the 3 products formed in the electrolysis of brine.
2. State a use for each product formed in the electrolysis of brine.
3. State how to test for each product formed in the electrolysis of brine.

Exothermic and Endothermic Reactions

1. Define exothermic and endothermic.
2. State what is meant by conservation of energy.
3. State the effect on the temperature of the surroundings in an exothermic reaction.
4. State the effect on the temperature of the surroundings in an endothermic reaction.
5. Give 2 examples of an exothermic reaction.
6. Give 2 examples of an endothermic reaction.

Reaction Profiles (and required practical)

1. Define activation energy.
2. State what reaction profiles show.
3. Draw a reaction profile for an exothermic reaction.
4. Draw a reaction profile for an endothermic reaction.
5. Is energy supplied or released to break bonds?
6. Is energy supplied or released to form bonds?

Bond Energy Calculations (Higher Only)

1. How is the overall energy change of a reaction calculated?
2. What does a negative overall energy change mean?
3. What does a positive overall energy change mean?

8. Balance half equations

By the end of Spring 1, the skills you will know are:

Making Salts:

1. How can filtration, evaporation and crystallisation be used to make a pure, dry sample of salt?
2. How can you test a substance made for purity?
3. What are the general word equations for: metal + acid, metal oxide + acid, metal hydroxide + acid and metal carbonate + acid.
4. Write a word equation for the reaction of zinc powder with sulphuric acid.
5. How from looking at a word equation can you tell is a salt is insoluble?
6. Why are the crystals made washed with water?
7. Define redox reaction (HT).
8. Explain how to identify which species are oxidised and which are reduced in terms of electron transfer (HT).
9. What is the difference between an alkali and a base?
10. What gas is produced when a carbonate is reacted? What is the test for this gas?

Key Maths Skills

11. Measure precisely using a measuring cylinder
12. Discuss resolution of practical equipment.
13. M_r of a compound = A_r of all the elements present in the compound

Electrolysis:

1. Define electrolysis.
2. Define oxidation and reduction.
3. Why when using a chloride solution should a potential difference no higher than 4V be used or the experiment left to run for more than 5 minutes?
4. Draw an annotated diagram for the electrolysis of copper (II) sulphate.
5. Write the half equations for this reaction (HT).
6. Describe any precautions the student should take to minimise the risks during the experiment.
7. What is the test and positive result for hydrogen gas? Carbon dioxide? Chlorine gas?

Key Maths Skills

Temperature Changes:

1. Why is a temperature probe better to use than a thermometer?
2. What equipment is used to measure mass and volume?
3. Define resolution.
4. Define precise.
5. Why is a polystyrene cup used instead of a beaker?
6. Give two possible sources of error in this experiment.
7. How else could thermal energy loss be minimised in this experiment?
8. Why is it important to repeat?

Key Maths Skills

9. Translate information between graphical and numerical form.

By the end of Spring 2, you will know:

States of matter, internal energy and gas pressure

1. What are the particle diagrams for the three states of matter?
2. Which state of matter has the most energy?
3. What happens to mass when a substance changes state?
4. Are changes of state physical or chemical changes?
5. What is internal energy?
6. What part of a system stores the energy?
7. What does heating do to the energy stored within a system?
8. What is the motion of molecules in a gas like?
9. What is the link between temperature of a gas and its kinetic energy?
10. What does increase the temperature of a gas do to the pressure (at a constant volume)?

Density (Required Practical)

1. What equation links density, mass and volume?
2. What are the units of each.
3. What two things can the particle model be used to explain?
4. Which is the densest state of matter?
5. What piece of equipment is used to measure mass?
6. What is the calculation for working out the volume of a regular shaped object?
7. What is the method for working out the volume of an irregular shaped object?
8. What is the method for working out the volume of a regular shaped object?

Changes in energy stores and conservation of energy

1. What are the 8 energy stores?
2. What are the 3 pathways to transfer energy?
3. What does conservation of energy mean?
4. What is a system?
5. What is the difference between a closed system and an open system?
6. What are the units of energy?
7. What is conservation of energy?
8. What is dissipated energy?
9. State 2 ways of reducing wasted energy.
10. Name 2 factors that affect the cooling of a building.
11. State the meaning of a closed system.
12. How do lubricants reduce unwanted heat transfer?

Calculating energy part 1 – Work done; elastic potential

1. What is the unit of work done?
2. What is displacement?
3. What is the equation to calculate work done?
4. What is 1 Joules?
5. What does work mean in science?
6. What is the relationship between work and energy?
7. Why is work done measured in Joules
8. What is elastic energy potential energy?
9. Name 3 examples of substances with elastic energy.
10. What does elastic mean?
11. What does elastic mean?
12. State one factor that affect the elastic energy of a substance.
13. State Hooke's law.

14. What is the formula to calculate elastic potential energy?

Calculating energy part 2 – GPE, KE

1. What is gravitational potential energy?
2. What are the factors that affect gravitational potential energy?
3. What is the formula and unit for gravitational potential energy?
4. What is the relationship between height and gravitational potential energy of an object?
5. What is a system?
6. What are the components that make up the system in the pendulum experiment?
7. What is the difference between a closed system and an open system?
8. What does kinetic energy mean?
9. What is kinetic energy measured in?
10. What is kinetic energy?
11. State two factors that affect kinetic energy.
12. What is the formula to calculate kinetic energy
13. State 3 examples of objects having kinetic energy?

Specific Heat Capacity (Required Practical)

1. What does the increase in temperature depend on in a system?
2. What is the definition of specific heat capacity?
3. What equation links energy change, mass, specific heat capacity and temperature change?
4. What are the units of each part of the equation?
5. What is specific heat capacity higher in – solids, liquids or gases?

Specific Latent heat (and calculation practice)

1. What changes when a substance changes state?
2. What does not change when a substance changes state?
3. What is the definition of specific latent heat?
4. What equation links energy, mass and specific latent heat?
5. What are the units of each?
6. What is the difference between specific latent heat of fusion and specific latent heat of vaporisation?
7. What is the difference between specific heat capacity and specific latent heat?

Energy dissipation and friction

1. What is meant by useful energy?
2. What is meant by wasted energy?
3. What is dissipated energy?
4. Give two effects friction has on an object such as; a drill.
5. Give two ways devices waste energy.
6. Give two ways to reduce the amount of energy devices waste.
7. What is an insulator?
8. State all the ways our homes are insulated
9. How does thickness affect thermal conductivity?
10. How does the thickness of the walls affect the rate of cooling of a building?

Energy and efficiency

1. What is efficiency?
2. What is the equation for efficiency?
3. Give two ways devices waste energy.
4. Give two ways to reduce the amount of energy devices waste.
5. State why machines are never 100% efficient.
6. State the minimum and maximum values of efficiency as a decimal or as a percentage.

Energy and Power & Electrical appliances

1. What 2 factors determines the amount of energy transferred by an electrical appliance?
2. When is work done in a circuit?
3. What are the equations to calculate energy transferred by an electrical device?
4. What is the equation that links energy transfer, charge flow and potential difference?
5. What is the unit and symbol of charge?
6. What is the relationship between the power rating of an electrical device and the changes in energy store?
7. What is power?
8. What is the unit of power?
9. State 2 factors that affect power.
10. What is the formula to calculate power?
11. What is the unit of charge?
12. What the formula that relates energy, charge and potential difference?

13. What is the formula that relates energy, power and time?
14. Does a kettle with a higher power rating do use more energy to boil 1L of water than that with a lower power rating?

Conduction & heating and insulating buildings

1. What is a thermal conductor?
2. What is a thermal insulator?
3. Name an example of a good conductor.
4. Name an example of a good insulator.
5. What is conduction?
6. What happens to particles during conduction?
7. How are homes heated?
8. What is cavity wall insulation?
9. Give 4 ways to reduce energy transfer from your home.

Non-renewable energy resources and biofuel

1. What are the main energy resources available for use on Earth?
2. What does non-renewable mean?
3. What are the non-renewable energy resources?
4. What are some of the uses of energy resources?
5. What is a biofuel?
6. What is an example of a biofuel?
7. What does carbon neutral mean?
8. What are the fuels for a fossil fuel power station?
9. What are the stages of operation in a fossil fuel power station?
10. What are the fuels for a nuclear power station?
11. What are the stages of operation of a nuclear power station?
12. What are the advantages of non-renewable energy resources?
13. What are the disadvantages of non-renewable energy

Renewable energy resources

1. What does renewable mean?
2. What are the renewable energy resources?
3. What are the stages of operation of a wind farm?
4. What are the stages of operation of a hydroelectric system?
5. What are the stages of operation of a solar panel?
6. What are the stages of operation of a geothermal power plant?

7. What are the advantages of each renewable energy resource?
8. What are the disadvantages of each renewable energy resources?

Energy demands, issues and the environment

1. What is meant by supply and demand?
2. What are the energy issues faced in the UK?
3. What are the environmental issues linked to using fossil fuels?
4. What are the environmental issues linked to using nuclear power?
5. What does start up time mean?
6. Which fossil fuel has the fastest start up time? Slowest start up time?
7. What is meant by base load?

By the end of Spring 2, the skills you will know are:

Specific Heat Capacity

1. What is specific heat capacity?
2. What is an immersion heater?
3. What piece of equipment do you use to measure mass?
4. What piece of equipment do you use to measure temperature?
5. How do you calculate temperature change?
6. Why is it important each type of metal is insulated?
7. Why is it important each metal is timed for the same amount of time?
8. What are the control variables?

Key Maths Skills

1. Translate information between graphical and numerical form.