**Atomic Structure and the Periodic Table**

1. What element is represented by W?

2. What element is represented by Na?

3. What element is represented by Si?

4. What element is represented by Co?

5. What element is represented by Fe?

6. What group is oxygen in?

7. What group is argon in?

8. What group is potassium in?

9. What group is sulfur in?

10. What group is chlorine in?

11. What period is phosphorous in?

12. What period is nitrogen in?

13. What period is calcium in?

14. What period is gallium in?

15. What period is carbon in?

16. What is a compound?

17. What is a mixture?

18. Give three ways of separating out mixtures.

19. What is the name for CO2?

20. What is the name for H2O?

21. What did Chadwick discover?

22. What experiment did Rutherford do?

23. What type of foil did Rutherford use?

24. What did Rutherford fire at the foil?

25. What model of the atom was Rutherford testing?

26. What did Rutherford discover?

27. What was the new model of the atom called?

28. Where are electrons?

29. Where are protons?

30. Where are neutrons?

31. What charge do protons have?

32. What charge do neutrons have?

33. What charge do electrons have?

34. What mass do protons have?

35. What mass do electrons have?

36. What mass do neutrons have?

37. What does the atomic number tell us?

38. What does the mass number tell us?

39. How do you find the number of protons in an atom?

40. How do you find the number of electrons in an atom?

41. How do you find the number of neutrons in an atom?

42. How do you find the number of protons in an ion?

43. How do you find the number of electrons in an ion?

44. How do you find the number of neutrons in an ion?

45. How many electrons fit on the first shell?

46. How many electrons fit on the second shell?

47. How many electrons fit on the third shell?

48. What element has the electronic structure 2,8,1?

49. What element has the electronic structure 2,3?

50. What element has the electronic structure 2,8,5?

51. What element has the electronic structure 2?

52. What element has the electronic structure 2,8,8,1?

53. What type of ions do metals form (positive/negative)?

54. What type of ions do non-metals form (positive/negative)?

55. What bonding occurs between two non-metals?

56. What bonding occurs between a metal and a non–metal?

57. What happens to the electrons in covalent bonding?

58. What happens to the electrons in ionic bonding?

59. How did Mendeleev organise his periodic table?

60. Why did Mendeleev leave gaps in his periodic table?

61. On which side (left/right) of the periodic table are metals found?

62. On which side (left/right) of the periodic table are non-metals found?

63. What is another name for group 1?

64. How reactive are group 1 elements?

65. How does reactivity change as you go down group 1?

66. How does sodium react with water?

67. How does sodium react with oxygen?

68. How does sodium react with chlorine?

69. What is another name for group 0/8?

70. How reactive are group 0 elements?

71. How does boiling point change as you go down group 0?

72. What is another name for group 7?

73. How reactive are group 7 elements?

74. How does boiling point change as you go down group 7?

75. How does reactivity change as you go down group 7?

GCSE Chemistry Separate Science Only

76. What are the properties of transition metals?

77. Give a use for transition metals

78. What colour does iron (II) go?

79. What colour does iron (III) go?

80. What colour does copper (II) go?

**Bonding and structure of matter**

1. Draw the arrangement of particles in a solid.

2. Draw the arrangement of particles in a liquid.

3. Draw the arrangement of particles in a gas.

4. What is it called when a solid turns into liquid?

5. What is it called when a liquid turns into a gas?

6. What is it called when a gas turns into liquid?

7. What is it called when a liquid turns into a solid?

8. What is the boiling point?

9. What is the condensing point?

10. What does this state symbol mean (s)?

11. What does this state symbol mean (l)?

12. What does this state symbol mean (g)?

13. What does this state symbol mean (aq)?

14. What is ionic bonding?

15. How are ions formed?

16. What type of ions with a metal form?

17. What type of ions will a non-metal form?

18. Where are metals on the periodic table

19. Where are non-metals on the periodic table?

20. What is an ionic bond?

21. Draw a dot and cross diagram to show the bonding in sodium chloride.

22. Draw a dot and cross diagram to show the bonding in magnesium chloride.

23. Draw a dot and cross diagram to show the bonding in magnesium oxide.

24. What is covalent bonding?

25. List six simple covalent compounds.

26. Give the formula of oxygen gas.

27. Give the formula of nitrogen gas.

28. Give the formula of hydrogen chloride.

29. Give the formula of ammonia.

30. Give the formula of methane.

31. Give the formula of hydrogen gas.

32. Give the formula of water.

33. Give the formula of carbon dioxide.

34. Draw the bonding in water.

35. Draw the bonding in carbon dioxide.

36. Draw the bonding in chlorine gas.

37. Draw the bonding in nitrogen gas.

38. Draw the bonding in oxygen gas.

39. Draw the bonding in hydrochloric acid.

40. Draw the bonding in ammonia.

41. Draw the bonding in methane.

42. In a covalent bonding diagram what does each line represent?

43. Give two examples of giant covalent compounds.

44. How does metallic bonding arise?

45. Why do metals have high boiling and melting points?

46. How are atoms in a pure metal arranged?

47. How are atoms in an alloy arranged?

48. Why do people use alloys and not pure metals?

49. How do metals conduct electricity?

50. Describe the structure of an ionic compound.

51. Describe the properties of an ionic compound.

52. Describe the structure of a simple covalent compound.

53. Describe the properties of a simple covalent compound.

54. Describe the structure of giant covalent compound.

55. Describe the properties of a giant covalent compound.

56. What is a monomer?

57. What is a polymer?

58. Describe the structure of a polymer.

59. Which element is both diamond and graphite made from?

60. Describe the bonding in diamond.

61. Describe the difference between the bonding in diamonds and the bonding in graphite?

62. What are the properties of graphite?

63. What are the uses of graphene?

64. What are the uses of fullerenes?

65. Describe the structure of fullerenes.

66. Describe the structure of carbon nanotubes.

67. What is the size of a nanoparticle?

68. Why do nanoparticles have different properties?

69. What can nanoparticle be used for?

70. What are the advantages and disadvantages of nanoparticles?

**Quantitative Chemistry**

1. Give three ways of measuring the mass or volume of a product or a reactant.

2. How do you calculate the concentration of a solution?

3. Give the formula of oxygen gas.

4. Give the formula of nitrogen gas.

5. Give the formula of hydrogen chloride.

6. Give the formula of ammonia.

7. Give the formula of methane.

8. Give the formula of hydrogen gas.

9. Give the formula of water.

10. Give the formula of carbon dioxide.

11. Balance this N2 +……….H2 ……….NH3

12. Balance this CaCl2 + KOH  Ca(OH)2 + KCl

13. Ammonia reacts with oxygen gas; write this as a balanced symbol equation.

14. Magnesium reacts with carbon dioxide; write this is a balanced symbol equation.

15. Define relative formula mass (Mr).

16. Define relative atomic mass (Ar).

17. What is the mass of argon?

18. What is the mass of calcium?

19. What is the mass of H2SO4?

20. What is the mass of MgO?

Higher tier only

21. What does the term mole mean?

22. What is equation for calculating moles?

23. What is Avogadro’s constant?

24. How do you calculate percentage yield of reaction?

25. How do you calculate the atom economy of a reaction?

26. Why might a reaction not give the expected yield?

27. What is the colour change in phenolphthalein?

28. What is the colour change in the methyl orange?

Higher tier

29. How do you calculate the concentration of the solution?

30. How much volume does 1 moles of gas take up at standard conditions?

**Chemical Changes**

1. Describe what happens when a metal reacts with oxygen.

2. List the order of the reactivity series.

3. How are unreactive metals found?

4. What is the formula of magnesium oxide?

5. What is the formula of calcium hydroxide?

6. What ion is responsible for acidity?

7. What ion is responsible for alkalinity?

8. Is pH1 acid, alkali or neutral?

9. Is pH7 acid, alkali or neutral?

10. Is pH14 acid, alkali or neutral?

11. Write down the neutralisation equation.

12. When do ionic compounds conduct electricity?

13. Why do ionic compounds need to molten or dissolved to conduct?

14. What happens to positive ions during electrolysis?

15. What happens negative ions during electrolysis?

16. If a metal chloride is being electrolysed what gas will be produced?

17. If metal sulfate is being electrolysed what gas will be produced?

18. How do you test for chlorine gas?

19. How do you test for hydrogen gas?

20. How do you test for oxygen gas?

Higher tier only

21. What is reduction?

22. What is oxidation?

23. Balance this ……….Cl- ……….  Cl2

24. Balance this Mg2+ …………….  Mg

25. Give an example of a strong acid.

26. Give an example of a weak acid.

27. What is a concentrated acid?

28. What is a dilute acid?

**Energy Changes**

1. How do you measure the rate of reaction?

2. Give two ways to measure the quantity of reactant or product.

3. What are the units for measuring rate of reaction?

4. How do you calculate the gradient for a tangent?

5. Give three ways to measure the rate of reaction.

6. How can a change in temperature affect the rate of reaction?

7. How a change in pressure affect the rate of reaction?

8. How can a change in concentration affect the rate of reaction?

9. How can a change in surface area affect the rate of reaction?

10. What is a catalyst?

11. How can a catalyst affect the rate of reaction?

12. Sketch an energy profile for catalysed and an uncatalysed reaction.

13. What symbol represents a reversible reaction?

14. What happens to ammonium chloride upon heating and cooling?

15. What happens to copper sulfate on the addition and removal of water?

Higher tier only

16. What is Le Chatelier’s Principle

**Organic Chemistry**

1. Define hydrocarbon.

2. What is crude oil made up from?

3. What is the general formula for alkanes?

4. Draw methane.

5. Draw ethane.

6. Draw propane.

7. Draw butane.

8. Why do we need to separate crude oil into fractions?

9. How does boiling point change with chain length?

10. How does viscosity change with chain length?

11. How does flammability change with chain length?

12. Write the word equation for complete combustion.

13. Why do we need to crack long hydrocarbons?

14. How do we test for alkenes?

Chemistry Only

15. What is the general formula for alkenes?

16. What does unsaturated mean?

17. Draw ethene.

18. Draw propene.

19. Draw butene.

20. Draw pentene.

21. What is the word equation for incomplete combustion?

22. What is the difference between complete and incomplete combustion?

23. Describe the reaction of an alkene with a halogen.

24. Describe the reaction of an alkene with water.

25. Describe the reaction of an alkene with hydrogen.

26. What is the functional group for alcohol?

27. Draw methanol.

28. Draw ethanol.

29. Draw propanol.

30. Draw butanol.

31. What is the main use of alcohol?

32. What happens when alcohol reacted oxygen?

33. What are the conditions needed for fermentation?

34. Draw the functional group for a carboxylic acid.

35. Draw methanoic acid.

36. Draw ethanoic acid.

37. Draw propanoic acid.

38. Draw butanoic acid.

39. What are the uses for carboxylic acids?

40. What happens when a carboxylic acid reacts with a carbonate?

41. What happens when a carboxylic acid reacts with water?

42. What happens when a carboxylic acid reacts with alcohol?

43. Draw ethyl ethanoate.

44. Define monomer.

45. Define polymer.

46. Describe polymerisation.

47. What is condensation polymerisation?

48. What is the structure of DNA?

49. How does DNA relate to amino acids?

50. Draw the basic structure of an amino acid.

**Chemical Analysis**

1. Define mixture.

2. Defiant formulation.

3. Define melting point.

4. How can melting point be used to determine if a compound is pure or not?

5. How can chromatography be used to determine if a compound is pure or not?

6. How do you calculate Rf values?

7. What is the test for hydrogen gas?

8. What is the test oxygen gas?

9. What is the test for carbon dioxide?

10. What is the test for chlorine gas?

Chemistry only

11. What colour flame test for lithium go?

12. What colour flame test for sodium go?

13. What colour flame test for potassium go?

14. What colour flame test for calcium go?

15. What colour flame test for copper go?

16. What happens when you react aluminium with sodium hydroxide?

17. What happens when you react calcium with sodium hydroxide?

18. What happens when you react magnesium with sodium hydroxide?

19. What happens when you react copper (II) with sodium hydroxide?

20. What happens when you react iron (II) with sodium hydroxide?

21. What happens when you react iron (III) with sodium hydroxide?

22. What is the test carbonate ions?

23. What is the test for halide ions?

24. What is the test for sulfate ions?

**Chemistry of the Atmosphere**

1. How much oxygen is there in the atmosphere?

2. How much carbon dioxide is there in the atmosphere?

3. How much nitrogen is there in the atmosphere?

4. How was the early atmosphere different to todays?

5. What led to an increase in oxygen in the atmosphere?

6. What led to the increase in nitrogen in the atmosphere?

7. Give two things that led to a decrease in carbon dioxide in the atmosphere.

8. What are three greenhouse gases?

9. How do greenhouse gases interact with radiation?

10. What impact does increased level of these gases in the atmosphere have on the climate?

11. Give two activities that lead to an increased level of greenhouse gases in the atmosphere.

12. What are the predictions of the effects of greenhouse gases on future temperature levels?

13. Define the term carbon footprint.

14. What are the major sources of atmospheric pollution?

15. What affect does carbon dioxide have on the atmosphere?

16. What affect does sulfur dioxide have on the atmosphere?

17. What affect does water vapour have on the atmosphere?

18. What affect does carbon monoxide have on the atmosphere?

19. What affect does nitrogen oxides have on the atmosphere?

20. What affect do carbon particles have on the atmosphere?

21. What affect does pollution have on humans?

22. What affects does pollution have on plants?

23. What affect does pollution have on animals?

**Using Resources**

1. What different ways can humans use the Earth’s resources?

2. Give 3 resources we get from the Earth.

3. Define finite resource.

4. Define renewable resource.

5. How do you produce portable water?

6. How do you sterilise water?

7. How do you desalinate water?

8. Why do we need to develop new methods to extract materials from the Earth?

9. What is bioleaching?

10. What is phytomining?

11. How do we assess the impact of an object?

12. How do we analyse a life-cycle assessment?

13. How can you reduce amount of resources used?

Chemistry Only

14. What is rusting?

15. How can we prevent corrosion?

16. What is the structure of an alloy?

17. How does the structure of an ally relate to its properties?

18. What is the composition of most of the glass we use?

19. What are clay ceramics?

20. How do the structure of polymers link to their properties?

21. What is the Haber process used for?

22. In the Haber process, where does the nitrogen and hydrogen come from?

23. In the Haber process, what are the conditions needed?