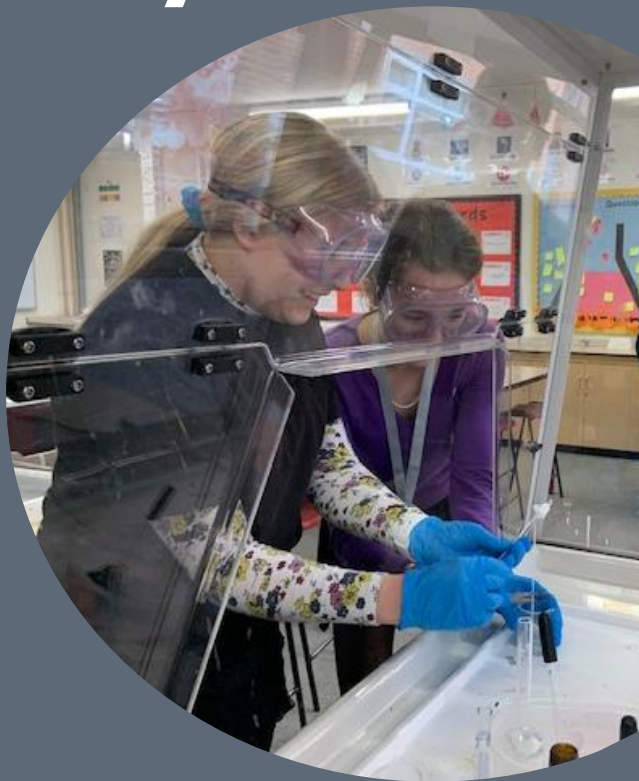


# A Level Chemistry

## Summer Work 2023-2024



**Sandringham School**

*Everybody can be Somebody*

# Summer Work

## ① Using this booklet



Watch

Using the QR code or link, watch the video and make detailed notes



Create

Create a resource e.g. flash cards or a mind map



Practice

Complete the attached practice questions



Review

Mark your practice questions using the mark scheme at the back of the booklet



Check

Follow the link to an online quiz, be honest with your scores!

## ② Summer to do list

Purchase appropriate laptop		
Purchase lever arch folder and dividers e.g. <a href="https://www.wilko.com/en-uk/wilko-a4-pink-lever-arch-file/p/0131460">https://www.wilko.com/en-uk/wilko-a4-pink-lever-arch-file/p/0131460</a>		
Purchase lab coat (preferably HOWIE style) e.g. <a href="https://www.workinstyle.com/howie-lab-coat.html">https://www.workinstyle.com/howie-lab-coat.html</a>		
Purchase practical revision guide <a href="https://www.hoddereducation.co.uk/subjects/science/products/16-18/aqa-a-level-chemistry-student-guide-practical-chem">https://www.hoddereducation.co.uk/subjects/science/products/16-18/aqa-a-level-chemistry-student-guide-practical-chem</a>		2
Print specification <a href="https://filestore.aqa.org.uk/resources/chemistry/specifications/AQA-7404-7405-SP-2015.PDF">https://filestore.aqa.org.uk/resources/chemistry/specifications/AQA-7404-7405-SP-2015.PDF</a>		

iii Engage in wider reading



*University of Cambridge Chemistry Department youtube page*

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*University of Oxford Chemistry Department youtube page*

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*A Day in the life of an undergraduate chemistry student*

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*TED Talks on Chemistry*

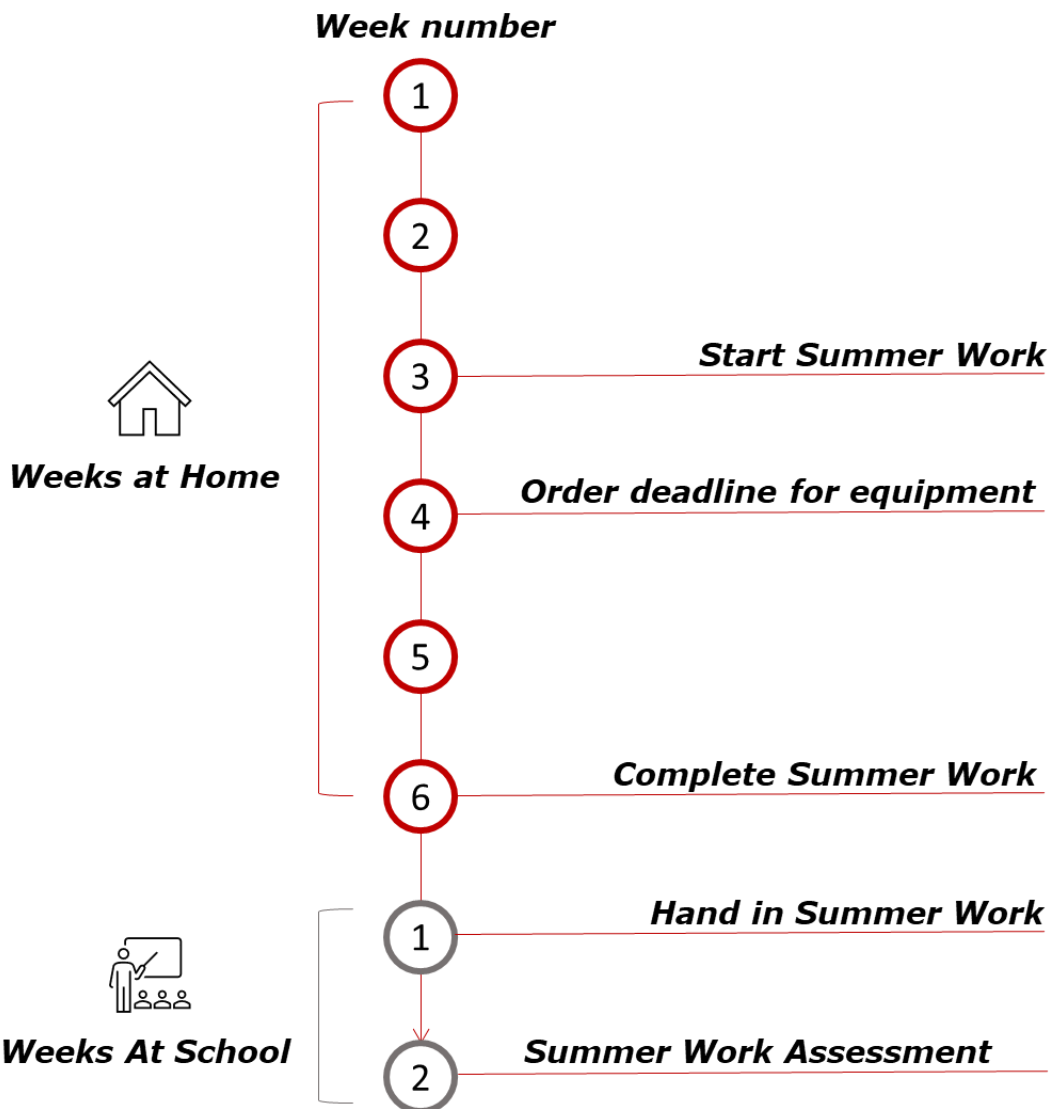
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*Variety of articles on recent uses of chemistry*



iv) *Recommended Summer plan*



v) *What to bring on the first day*



- Folder with Dividers
- Printed Specification
- Lab Coat
- Laptop
- Completed summer work
- Revision notes / flashcards

I studied combined chemistry at GCSE, how can I start A level as strongly as possible?

Most of this summer work is aimed at ensuring that everybody has the correct foundational knowledge in September. The main differences between triple and combined chemistry are found in quantitative chemistry or organic chemistry, so try to learn those triple modules before arriving in September.

I want to become a medic or vet, what do I need to do to increase my chances of this?

Firstly, for many of these courses you are required to get an A or A\* at Chemistry, so ensuring you come with a strong chemical background is very important. Once you have done this, you should pursue further reading and work experience opportunities as soon as possible and discuss future plans with the school careers guidance team.

I am having trouble accessing part of my summer work, what can I do?

Email Mr Reynolds at [ReynoldsH@mysandstorm.org](mailto:ReynoldsH@mysandstorm.org)

# Chemical Bonding



Watch



<https://www.youtube.com/watch?v=YpEQ-NWxKBc>



Practice

Sign up to Seneca and complete the assignment 'SUMMER WORK – bonding'

Scan to join 18ev3mw4ti



Get your students to scan the QR code and log in to Seneca to join this class.



Create

Download the revision booklet, review it and make your own notes and flashcards



<https://chemrevise.files.wordpress.com/2021/02/4.2-bonding-and-structure.pdf>



Review

Get a blank piece of A4 paper and write out everything you can remember about bonding on to it. Then use your revision resources to fill in the things you forgot!



Check

Log on to the Quiz below and attempt the questions

[https://gradegorilla.com/chemistry/micro/principles/M\\_bonding.php](https://gradegorilla.com/chemistry/micro/principles/M_bonding.php)



Score: / 10

# Organic Chemistry



Watch



<https://www.youtube.com/watch?v=ZeUNWY7YDAo>



Practice

Sign up to Seneca and complete the assignment 'SUMMER WORK – Organic Chemistry'

Scan to join 18ev3mw4ti



Get your students to scan the QR code and log in to Seneca to join this class.



Create

Download the revision booklet, review it and make your own notes and flashcards



<https://chemrevise.files.wordpress.com/2021/02/4.7-organic-chemistry.pdf>



Review

Download the question papers for 7.1, 7.2 and 7.3 from Physics and Maths tutor. Complete them and then mark them!



<https://www.physicsandmathstutor.com/chemistry-revision/gcse-aqa/organic-chemistry/>

# Ionic Formulae

## 1 Polyatomic Ions



Watch



<https://www.youtube.com/watch?v=gTvwmlH7zLk>



Create

Create a flashcard for each polyatomic ion in the table below including name, formula and charge. Make sure you review these regularly

Common Polyatomic Ions			
Ion	Name	Ion	Name
$\text{NH}_4^+$	Ammonium	$\text{CO}_3^{2-}$	Carbonate
$\text{NO}_2^-$	Nitrite	$\text{HCO}_3^-$	Hydrogen carbonate Or Bicarbonate
$\text{NO}_3^-$	Nitrate	$\text{ClO}^-$	Hypochlorite
$\text{SO}_3^{2-}$	Sulfite	$\text{ClO}_2^-$	Chlorite
$\text{SO}_4^{2-}$	Sulfate	$\text{ClO}_3^-$	Chlorate
$\text{HSO}_4^-$	Hydrogen sulfate or Bisulfate	$\text{ClO}_4^-$	Perchlorate
$\text{OH}^-$	Hydroxide	$\text{C}_2\text{H}_3\text{O}_2^-$	Acetate
$\text{CN}^-$	Cyanide	$\text{MnO}_4^-$	Permanganate
$\text{PO}_4^{3-}$	Phosphate	$\text{Cr}_2\text{O}_7^{2-}$	Dichromate
$\text{HPO}_4^{2-}$	Hydrogen phosphate	$\text{CrO}_4^{2-}$	Chromate
$\text{H}_2\text{PO}_4^{2-}$	Dihydrogen phosphate	$\text{O}_2^{2-}$	Peroxide



## 2 Determining Ionic Formulae



Watch



[https://youtu.be/ct\\_7qhxh6JE](https://youtu.be/ct_7qhxh6JE)



<https://www.youtube.com/watch?v=iQEGrX5Ud6g>



Practice

- |   |    |                       |       |   |    |                      |       |
|---|----|-----------------------|-------|---|----|----------------------|-------|
| 1 | a) | sodium iodide         | ..... | 2 | a) | sodium sulfate       | ..... |
|   | b) | potassium oxide       | ..... |   | b) | calcium sulfate      | ..... |
|   | c) | aluminium chloride    | ..... |   | c) | magnesium hydroxide  | ..... |
|   | d) | magnesium bromide     | ..... |   | d) | zinc(II) nitrate     | ..... |
|   | e) | aluminium oxide       | ..... |   | e) | copper(II) carbonate | ..... |
|   | f) | iron(II) oxide        | ..... |   | f) | sodium hydroxide     | ..... |
|   | g) | iron(III) oxide       | ..... |   | g) | potassium carbonate  | ..... |
|   | h) | magnesium sulfide     | ..... |   | h) | iron(III) hydroxide  | ..... |
|   | i) | copper(II) fluoride   | ..... |   | i) | ammonium nitrate     | ..... |
|   | j) | lithium iodide        | ..... |   | j) | ammonium hydroxide   | ..... |
|   | k) | barium bromide        | ..... |   | k) | iron(III) sulfate    | ..... |
|   | l) | zinc(II) sulfide      | ..... |   | l) | aluminium nitrate    | ..... |
|   | m) | lead(II) iodide       | ..... |   | m) | silver(I) nitrate    | ..... |
|   | n) | iron(III) sulfide     | ..... |   | n) | calcium carbonate    | ..... |
|   | o) | magnesium oxide       | ..... |   | o) | magnesium nitrate    | ..... |
|   | p) | rubidium bromide      | ..... |   | p) | ammonium astatide    | ..... |
|   | q) | strontium chloride    | ..... |   | q) | caesium nitrate      | ..... |
|   | r) | caesium selenide      | ..... |   | r) | strontium hydroxide  | ..... |
|   | s) | calcium astatide      | ..... |   | s) | platinum(II) nitrate | ..... |
|   | t) | radium polonide       | ..... |   | t) | cobalt(II) carbonate | ..... |
|   | u) | gallium fluoride      | ..... |   | u) | copper(I) oxide      | ..... |
|   | v) | scandium(III) bromide | ..... |   | v) | copper(II) oxide     | ..... |
|   | w) | chromium(III) oxide   | ..... |   | w) | francium telluride   | ..... |
|   | x) | strontium iodide      | ..... |   | x) | gold(I) fluoride     | ..... |
|   | y) | lithium arsenide      | ..... |   | y) | rubidium sulfate     | ..... |



Turn to the back of the booklet and mark your answers on the previous page

Score: / 50



Log on to the Quizlet below and attempt the questions



<https://quizlet.com/207566438/ionic-formula-flash-cards/>

Score: / 56

# Balancing Equations



Watch



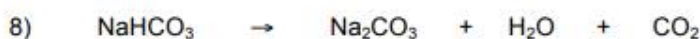
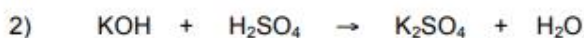
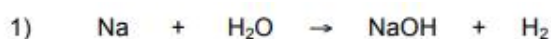
<https://www.youtube.com/watch?v=jy6F0Lbvjm8>



<https://classroom.thenational.academy/lessons/balancing-equations-using-moles-ht-only-6gwkar?step=2&activity=video>



Practice





Review

Turn to the back of the booklet and mark your answers on the previous page

Score: / 9



Check

Log on to the quiz below and attempt the questions



<https://www.educationquizzes.com/gcse/chemistry/balancing-symbol-equations-h/>

Score: / 10

# Quantitative Chemistry



Watch



<https://www.youtube.com/watch?v=eAibVvhmsK0>



Practice

Sign up to Seneca and complete the assignment 'SUMMER WORK – Quant Chem'

Scan to join 18ev3mw4ti



Get your students to scan the QR code and log in to Seneca to join this class.



Create

Download the revision booklet, review it and make your own notes



<https://chemrevise.files.wordpress.com/2023/05/4.3-quantitative-chemistry.pdf>



Review

Get a blank piece of A4 paper and write out everything you can remember about bonding on to it. Then use your revision resources to fill in the things you forgot!

# ① Calculating Formula Mass



Watch



[https://www.youtube.com/watch?v=it\\_fmQu5ivg](https://www.youtube.com/watch?v=it_fmQu5ivg)



Practice

- 1  $F_2$
- 2  $Fe$
- 3  $H_2SO_4$
- 4  $Al_2O_3$
- 5  $Mg(OH)_2$
- 6  $Al(NO_3)_3$
- 7  $(NH_4)_2SO_4$
- 8  $CuCO_3$
- 9  $AgNO_3$
- 10  $NH_4NO_3$



Review

Turn to the back of the booklet and mark your answers

Score: / 10

## ② Mole Calculations



Watch



<https://www.youtube.com/watch?v=wPGVQu3UXpw>



Practice

1) Calculate the number of moles of each of the following substances. Give your answers to 3 sig figs.

- a) 90.0 g of  $\text{H}_2\text{O}$  .....
- b) 20.0 g of  $\text{C}_4\text{H}_{10}$  .....
- c) 685 g of  $\text{NH}_3$  .....
- d) 102 tons of  $\text{O}_2$  .....
- e) 2.00 kg of  $\text{Al}_2\text{O}_3$  .....
- f) 20.6 mg of Au .....

2) Calculate the mass of each of the following substances. Give your answers to 3 sig figs.

- a) 4.00 moles of  $\text{N}_2$  .....
- b) 0.100 moles of  $\text{HNO}_3$  .....
- c) 0.0200 moles of  $\text{K}_2\text{O}$  .....
- d) 2.50 moles of  $\text{PH}_3$  .....
- e) 0.400 moles of  $\text{C}_2\text{H}_5\text{OH}$  .....
- f) 10.0 moles of  $\text{Ca}(\text{OH})_2$  .....



Review

Turn to the back of the booklet and mark your answers

Score: / 12

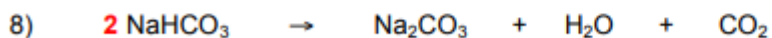
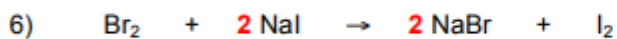
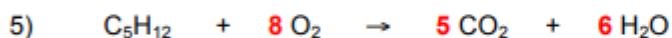
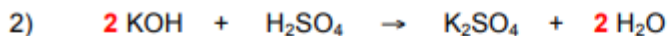
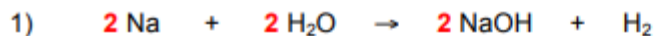
# Answers

## ① Ionic Formulae (*page 9*)

- |          |    |                                |          |    |   |
|----------|----|--------------------------------|----------|----|---|
| <b>1</b> | a) | NaI                            | <b>2</b> | a) | Na <sub>2</sub> SO <sub>4</sub>                 |
|          | b) | K <sub>2</sub> O               |          | b) | CaSO <sub>4</sub>                               |
|          | c) | AlCl <sub>3</sub>              |          | c) | Mg(OH) <sub>2</sub>                             |
|          | d) | MgBr <sub>2</sub>              |          | d) | Zn(NO <sub>3</sub> ) <sub>2</sub>               |
|          | e) | Al <sub>2</sub> O <sub>3</sub> |          | e) | CuCO <sub>3</sub>                               |
|          | f) | FeO                            |          | f) | NaOH  |
|          | g) | Fe <sub>2</sub> O <sub>3</sub> |          | g) | K <sub>2</sub> CO <sub>3</sub>                  |
|          | h) | MgS                            |          | h) | Fe(OH) <sub>3</sub>                             |
|          | i) | CuF <sub>2</sub>               |          | i) | NH <sub>4</sub> NO <sub>3</sub>                 |
|          | j) | LiI                            |          | j) | NH <sub>4</sub> OH                              |
|          | k) | BaBr <sub>2</sub>              |          | k) | Fe <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub> |
|          | l) | ZnS                            |          | l) | Al(NO <sub>3</sub> ) <sub>3</sub>               |
|          | m) | PbI <sub>2</sub>               |          | m) | AgNO <sub>3</sub>                               |
|          | n) | Fe <sub>2</sub> S <sub>3</sub> |          | n) | CaCO <sub>3</sub>                               |
|          | o) | MgO                            |          | o) | Mg(NO <sub>3</sub> ) <sub>2</sub>               |
|          | p) | RbBr                           |          | p) | NH <sub>4</sub> At                              |
|          | q) | SrCl <sub>2</sub>              |          | q) | CsNO <sub>3</sub>                               |
|          | r) | CsSe                           |          | r) | Sr(OH) <sub>2</sub>                             |
|          | s) | CaAt <sub>2</sub>              |          | s) | Pt(NO <sub>3</sub> ) <sub>2</sub>               |
|          | t) | RaPo                           |          | t) | CoCO <sub>3</sub>                               |
|          | u) | GaF <sub>3</sub>               |          | u) | Cu <sub>2</sub> O                               |
|          | v) | ScBr <sub>3</sub>              |          | v) | CuO   |
|          | w) | Cr <sub>2</sub> O <sub>3</sub> |          | w) | Fr <sub>2</sub> Te                              |
|          | x) | SrI <sub>2</sub>               |          | x) | AuF   |
|          | y) | Li <sub>3</sub> As             |          | y) | Rb <sub>2</sub> SO <sub>4</sub>                 |



## 2) Balancing Equations (*page 11*)



### 3 Formula Mass Calculations (*page 14*)

1	F <sub>2</sub>	2(19)	= 38
2	Fe		= 56
3	H <sub>2</sub> SO <sub>4</sub>	2(1) + 32 + 4(16)	= 98
4	Al <sub>2</sub> O <sub>3</sub>	2(27) + 3(16)	= 102
5	Mg(OH) <sub>2</sub>	24 + 2(16) + 2(1)	= 58
6	Al(NO <sub>3</sub> ) <sub>3</sub>	27 + 3(14) + 9(16)	= 213
7	(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	2(14) + 8(1) + 32 + 4(16)	= 132
8	CuCO <sub>3</sub>	63.5 + 12 + 3(16)	= 123.5
9	AgNO <sub>3</sub>	108 + 14 + 3(16)	= 170
10	NH <sub>4</sub> NO <sub>3</sub>	14 + 4(1) + 14 + 3(16)	= 80

### 4 Mole Calculations (*page 15*)

1) Calculate the number of moles of each of the following substances. Give your answers to 3 significant figures.

- a) 90.0 g of H<sub>2</sub>O  $\frac{90.0}{18} = 5.00$
- b) 20.0 g of C<sub>4</sub>H<sub>10</sub>  $\frac{20.0}{58} = 0.345$
- c) 685 g of NH<sub>3</sub>  $\frac{685}{17} = 40.3$
- d) 102 tons of O<sub>2</sub>  $\frac{102000000}{32} = 3190000 (3.19 \times 10^6)$
- e) 2.00 kg of Al<sub>2</sub>O<sub>3</sub>  $\frac{2000}{102} = 19.6$
- f) 20.6 mg of Au  $\frac{0.0206}{197} = 0.000105 (1.05 \times 10^{-4})$

2) Calculate the mass of each of the following substances. Give your answers to 3 significant figures.

- a) 4.00 moles of N<sub>2</sub>  $4.00 \times 28 = 112 \text{ g}$
- b) 0.100 moles of HNO<sub>3</sub>  $0.100 \times 63 = 6.30 \text{ g}$
- c) 0.0200 moles of K<sub>2</sub>O  $0.0200 \times 94 = 1.88 \text{ g}$
- d) 2.50 moles of PH<sub>3</sub>  $2.50 \times 34 = 85.0 \text{ g}$
- e) 0.400 moles of C<sub>2</sub>H<sub>5</sub>OH  $0.400 \times 46 = 18.4 \text{ g}$
- f) 10.0 moles of Ca(OH)<sub>2</sub>  $10.0 \times 74 = 740 \text{ g}$