

Criterion A revision — study guide

Grade 7 · IB MYP 2 Sciences · Unit 1 Chemistry's Secrets Unlocked · whole Chemistry unit

Name: _____ Class: _____ Date: _____

How to use this study guide

- It helps you revise the whole Chemistry unit before your **Criterion A test**.
- Write your answers in the **My answer** column. Use full sentences and chemistry words.
- When you check your work with the answer sheet, write what you got right (✓) or need to fix in the **Self-check** column.

What Criterion A (Knowing and understanding) asks you to do

Know it — state facts and definitions (atom, element, acid, salt ...).

Use it — apply your knowledge to explain a familiar situation (vinegar, soap, a bee sting).

Judge it — use what you know to explain or decide in an unfamiliar situation you have never seen before.

Command terms: *State* (give a short fact) · *Define* (give the exact meaning) · *Outline* (give a brief account) · *Describe* (give a detailed account) · *Explain* (give reasons — use "because") · *Suggest* (give a sensible idea using your knowledge) · *Justify* (give reasons for your choice).

What I need to know — checklist

Tick each goal you are confident about now. Come back and tick the rest after you finish the study guide.

- ☐ I can define atom, element, compound and mixture, and give two examples of each.
- ☐ I can explain the difference between a compound and a mixture.
- ☐ I can describe the properties of acids and alkalis and name everyday examples.
- ☐ I can use the pH scale (0–14) to say if something is acidic, neutral or alkaline, and how strong it is.
- ☐ I can state the colours of universal indicator and litmus in acids and alkalis.
- ☐ I can describe neutralisation and write its word equation.
- ☐ I can name the salt made when an acid reacts with an alkali.
- ☐ I can use all of this to explain real-life situations.

A · Atoms, elements, compounds and mixtures

#	What I need to know (question or situation)	My answer	Self-check
A1	State what an atom is.		
A2	Define an element. Give two examples with their chemical symbols.		
A3	Define a compound. Give two examples with their formulas.		
A4	Define a mixture. Give two everyday examples.		
A5	Explain two differences between a compound and a mixture (think about fixed amounts and how easily they can be separated).		
A6	Sort these into element, compound or mixture: oxygen (O ₂), water (H ₂ O), air, sodium chloride (NaCl), iron (Fe), salt water, carbon dioxide (CO ₂), orange juice.		
A7	Iron is grey and magnetic. Sulfur is yellow. Iron sulfide is a black solid that is not magnetic. Explain what this tells you about the properties of a compound compared with the elements it is made from.		
A8	<i>Situation:</i> A gold ring is labelled "24 carat – pure gold". A cheaper ring is "9 carat": gold mixed with copper and silver. Which ring is an element and which is a mixture? Explain your answer.		

#	What I need to know (question or situation)	My answer	Self-check
A9	<i>Situation:</i> You spilt salt into a tray of sand and water. Describe the steps you would use to get back the dry salt. Name each separation method.		
A10	<i>Situation:</i> The diagram shows a box of particles: some single circles, some pairs of joined identical circles, and some joined circles of two different colours. Explain whether this box shows a pure substance or a mixture.		

B • Acids and alkalis

Complete the comparison table first, then answer the questions.

Property	Acids	Alkalis
pH range		
Colour of blue litmus paper		
Colour of red litmus paper		
Taste (never test in the lab!)		
How they feel on skin		
Three everyday examples		
Three lab examples		

#	What I need to know (question or situation)	My answer	Self-check
B1	State what an alkali is. How is it different from a base?		

#	What I need to know (question or situation)	My answer	Self-check
B2	Outline why strong acids and strong alkalis both have a hazard symbol for "corrosive".		
B3	<i>Situation:</i> Your friend says, "Acids are always dangerous." Use two foods or drinks to explain why this is not true.		
B4	<i>Situation:</i> During a practical, a student spills dilute sodium hydroxide on their hand. Describe what they should do and explain why.		
B5	<i>Situation:</i> You have two colourless liquids, one acid and one alkali, but the labels fell off. Describe a safe test to find out which is which and what result you would see.		
B6	<i>Situation:</i> Old-fashioned soap made from strong alkali can make skin feel dry and sore. Suggest why.		

C • The pH scale

Fill in the universal indicator table.

pH	0-2	3-6	7	8-11	12-14
Universal indicator colour					
Strong / weak acid, neutral, weak / strong alkali					
One example					

#	What I need to know (question or situation)	My answer	Self-check
C1	State what the pH scale measures and its range.		

#	What I need to know (question or situation)	My answer	Self-check
C2	State the pH of pure water and what we call a substance with this pH.		
C3	Put these in order from most acidic to most alkaline: oven cleaner (pH 13), lemon juice (pH 2), pure water (pH 7), milk (pH 6.5), baking soda solution (pH 9), stomach acid (pH 1.5).		
C4	Explain why universal indicator is more useful than litmus paper.		
C5	<i>Situation:</i> Normal rain has a pH of about 5.6. Rain near a factory has a pH of 4. Which is more acidic? Suggest one effect this rain could have on statues or lakes.		
C6	<i>Situation:</i> Blueberries grow best in soil of pH 4.5–5.5. A gardener tests the soil: it is pH 7. Is the soil suitable? Suggest what kind of substance the gardener should add and why.		
C7	<i>Situation:</i> Your stomach contains hydrochloric acid at about pH 2. Suggest why your body needs such a strong acid there.		

D • Neutralisation

#	What I need to know (question or situation)	My answer	Self-check
D1	Define neutralisation.		
D2	Complete the general word equation: acid + alkali → _____ + _____		

#	What I need to know (question or situation)	My answer	Self-check
D3	You slowly add sodium hydroxide to hydrochloric acid with universal indicator in it. Describe how the colour and the pH change until the solution is neutral.		
D4	<i>Situation:</i> A bee sting is acidic. A wasp sting is alkaline. Which would you treat with baking soda (pH 9) and which with vinegar (pH 3)? Explain using the word <i>neutralisation</i> .		
D5	<i>Situation:</i> Indigestion is caused by too much stomach acid. Explain how an indigestion tablet (a base such as magnesium hydroxide) helps.		
D6	<i>Situation:</i> A farmer's field is too acidic for crops. The farmer spreads lime (calcium hydroxide) on it. Explain why, and suggest what could happen if the farmer added far too much.		
D7	<i>Situation:</i> Bacteria in your mouth make acid that damages tooth enamel. Toothpaste is slightly alkaline. Explain how brushing helps protect your teeth.		

E • Naming salts

How to name a salt

A salt's name has two parts: **1st name** = the metal from the alkali (or base) · **2nd name** = comes from the acid.

Practise and check your salt names in the **Salt naming simulation**: scan the QR code or go to school.taneski.com/science/g07/01-salt-naming/.



Scan to open

Acid	Second part of the salt name
Hydrochloric acid	
Sulfuric acid	
Nitric acid	

Complete each word equation.

#	Acid	Alkali / base	Salt	Other product
E1	hydrochloric acid	sodium hydroxide		
E2	sulfuric acid	potassium hydroxide		
E3	nitric acid	sodium hydroxide		
E4	hydrochloric acid	calcium hydroxide		
E5	sulfuric acid	magnesium hydroxide		
E6		potassium hydroxide	potassium chloride	water
E7	nitric acid		calcium nitrate	water

#	What I need to know (question or situation)	My answer	Self-check
E8	State the chemical name of table salt and which acid and alkali can make it.		
E9	<i>Situation:</i> A fertiliser bag says it contains potassium nitrate. Suggest which acid and which alkali could be used to make it.		

Unfamiliar situation challenge

You have not seen these situations before. Use everything from Sections A–E.

Situation 1 — The swimming pool. A pool manager must keep the water between pH 7.2 and 7.8. Today the test shows pH 8.4 and swimmers complain of itchy eyes.

#	Question	My answer	Self-check
S1a	Is the pool water acidic, neutral or alkaline today?		
S1b	Suggest whether the manager should add a dilute acid or an alkali. Explain why.		
S1c	The manager adds dilute hydrochloric acid, and some sodium hydroxide is in the water. Name the salt that forms.		
S1d	Explain why the manager should add the chemical slowly and test the pH again, rather than pour in a lot at once.		

Situation 2 — The mystery liquids. A lab technician tests four unlabelled liquids with universal indicator.

Liquid	Colour with universal indicator
P	red
Q	green
R	purple
S	yellow

#	Question	My answer	Self-check
S2a	Estimate the pH of each liquid and say if it is acidic, neutral or alkaline.		
S2b	Which liquid could be pure water? Which could be lemon juice? Explain your choices.		

#	Question	My answer	Self-check
S2c	The technician mixes liquids P and R in the right amounts. Predict the colour of the indicator at the end and explain what happened.		
S2d	Which liquid would be the most dangerous to spill? Justify your judgement.		

Add your own situation

Write three real-life situations where this chemistry is used: at home, in the kitchen, in sport, in nature or in a job. Swap with a partner: answer theirs in the *Partner's answer* column, then check each other's work.

Ideas to get you started: cleaning a kettle with vinegar, an ant bite, a cake rising with baking soda, a fish tank, a car battery.

#	My situation and question	Topic (A-E)	Partner's answer	My feedback to my partner
1				
2				
3				

Self-reflection

Question	My answer
Two things I am confident about	
Two things I still need to revise	
One situation question I found hard, and why	
My plan to revise before the test	