THE RESERVANTER SERVANTER

90944M



Tohua tēnei pouaka

mēnā kāore he tuhituhi i roto i tēnei pukapuka

SUPERVISOR'S USE ONLY

Pūtaiao, Kaupae 1, 2020

QUALIFY FOR THE FUTURE WORLD

KIA NOHO TAKATŪ KI TŌ ĀMUA AO!

90944M Te whakaatu māramatanga ki ngā āhuatanga o te waikawa me te pāpāhua

9.30 i te ata Rāmere 27 Whiringa-ā-rangi 2020 Whiwhinga: Whā

Paetae	Kaiaka	Kairangi
Te whakaatu māramatanga ki ngā āhuatanga o te waikawa me te pāpāhua.	Te whakaatu māramatanga hōhonu ki ngā āhuatanga o te waikawa me te pāpāhua.	Te whakaatu māramatanga matawhānui ki ngā āhuatanga o te waikawa me te pāpāhua.

Tirohia mēnā e rite ana te Tau Ākonga ā-Motu (NSN) kei runga i tō puka whakauru ki te tau kei runga i tēnei whārangi.

Me whakamātau koe i ngā tūmahi KATOA kei roto i tēnei pukapuka.

Tangohia te Pukapuka Rauemi 90944MR i waenganui o tēnei pukapuka.

Mēnā ka hiahia whārangi atu anō koe mō ō tuhinga, whakamahia ngā whārangi wātea kei muri o tēnei pukapuka, ka āta tohu ai i te tau tūmahi.

Tirohia mēnā e tika ana te raupapatanga o ngā whārangi 3-19 kei roto i tēnei pukapuka, ka mutu, kāore tētahi o aua whārangi i te takoto kau.

ME HOATU RAWA KOE I TĒNEI PUKAPUKA KI TE KAIWHAKAHAERE Ā TE MUTUNGA O TE WHAKAMĀTAUTAU.

TAPEKE

TŪMAHI TUATAHI

MĀ TE KAIMĀKA ANAKE

(a) (i) He pūmotu kei te Taka Pūmotu te konutai me te hāora.

11 **Na** 8

Mā te whakamahi i ngā mōhiohio kua tukuna, tātuhia te nahanaha irahiko o te ngota konutai me te ngota hāora.

Konutai	Hāora

He **ōrite** te nahanaha irahiko o ngā katote konutai me ngā katote ōkai.

(ii) Tuhia te nahanaha irahiko o ngā katote konutai me ngā katote ōkai

Te nahanaha irahiko o ngā katote **e rua**:

(iii) He aha te take he ōrite ngā katote konutai me ngā katote ōkai engari he rerekē ngā whana?

I tō tuhinga, me kōrero koe mō te maha o ngā iraoho, te whana, me te nahanaha irahiko o ngā katote e rua.

He wāhi anō mō tō tuhinga mō tēnei tūmahi kei te whārangi 4.

QUESTION ONE

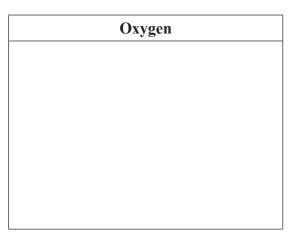
ASSESSOR'S USE ONLY

(a) (i) Sodium and oxygen are elements on the periodic table.

11 **Na** o

Using the information supplied, draw the electron arrangement of a sodium atom and an oxygen atom.

Sodium		



Sodium ions and oxide ions have the **same** electron arrangement.

(ii) State the electron arrangement of the sodium ions and oxide ions

Electron arrangement of **both** ions:

(iii) How can sodium ions and oxide ions have the same electron arrangement but different charges?

In your answer you should refer to the number of protons, charge, and electron arrangement of the two ions.

	There is more snace for

There is more space for your answer to this question on page 5.

MĀ TE
KAIMĀKA
ANAKE

•	gā mehanga kano	kore tapakore e rua ko te:	
		waro-rua, NaHCO ₃	
•	konutai waihā, N		
		te tautuhi mā te whakamahi noa iho bungatara, H ₂ SO ₄ .	o i te pepa tohu waikawa whero i
(i)		ohi, e whakaahua ana i ngā kitenga	ka puta.
	Mehanga tapakore	Kitenga (mēnā i puta) me te pepa tohu waikawa whero	Kitenga (mēnā i puta) me t waikawa pungatara (H ₂ SO
	konutai pākawa waro-rua, NaHCO ₃		
	konutai waihā, NaOH		
(ii)	Whakamāramah	ia ia kitenga, ā, e pēhea ana ka āwhi	na ēnei kia tautohua mehanga.

whārangi 6.

ASSESSOR'
LICE ONLY

	(b)	Two	unlabelled	colourless	solutions	are known	to	be:
--	---	----	-----	------------	------------	-----------	-----------	----	-----

- sodium hydrogen carbonate, NaHCO₃
- sodium hydroxide, NaOH.

(ii)

These solutions can be identified using only red litmus paper and sulfuric acid, $\rm H_2SO_4$, solution.

(i) Complete the table, describing any observations that would be made.

Unlabelled solution	Observation (if any) with red litmus paper	Observation (if any) with sulfuric acid (H ₂ SO ₄)
sodium hydrogen carbonate, NaHCO ₃		
sodium hydroxide, NaOH		

Explain each of the observations and how these allow the solutions to be identified.		
	There is more space for your answer to this question on page 7.	

		MĀ TE KAIMĀKA ANAKE
		
(iii)	Whakaotia te whārite ā-kupu me te whārite tohu mō ngā tauhohenga ka puta.	
konutai p	oākawa waro-rua + waikawa pungatara →	
Whārite to	ohu taurite	
konutai v	vaihā + waikawa pungatara →	
Whārite to	ohu taurite	

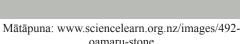
		ASSESSOR'S USE ONLY
(iii)	Complete the word and symbol equations for the reactions that take place.	
sodium h	ydrogen carbonate + sulfuric acid →	
Balanced	symbol equation	
sodium h	ydroxide + sulfuric acid →	
Balanced	symbol equation	

TŪMAHI TUARUA

Whakamahia ai te kōhatu Oamaru mō ngā hangahanga i Aotearoa. He ranunga konupūmā pākawa waro me ētahi matū hohe-kore.

I whakahohea ia tīpakonga 5 g o te kōhatu Oamaru ki te rōrahi ōrite ki te waikawa pūhaumāota.





Papatipu o te puoto

me ngā matū i roto /

kōhatu



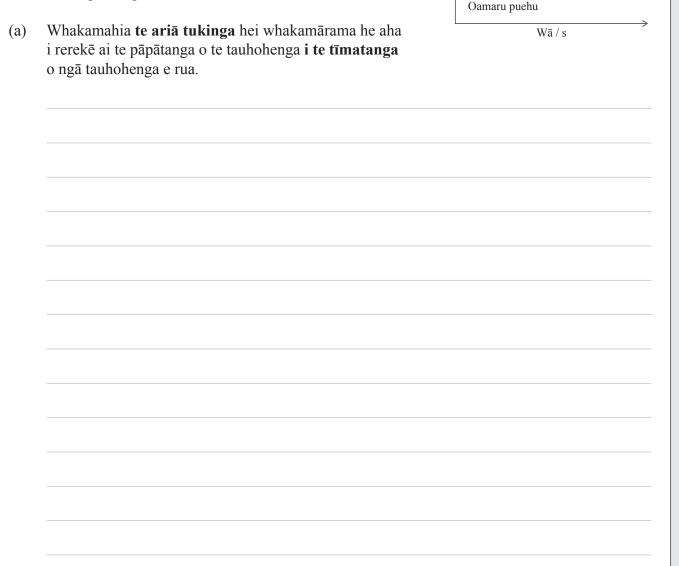
kōhatu Oamaru kotakota

oamaru-stone

konupūmā pākawa waro + waikawa pūhaumāota → konupūmā pūhaumāota + wai + hauhā

Ko tētahi tīpakonga he kōhatu Oamaru puehu, ko tētahi atu he kōhatu Oamaru kotakota. I whakamahia taua kukūtanga anō o te waikawa pūhaumāota mō ia tīpakonga.

I inea te papatipu tōpū o ia puoto kia noho pūmau te papatipu, ā, ka tuhia ngā otinga ki tētahi kauwhata.



QUESTION TWO

Oamaru stone is used as a building material in New Zealand. It is a mixture of calcium carbonate and some unreactive chemicals.

5 g samples of Oamaru stone were each reacted with the same volume of hydrochloric acid.





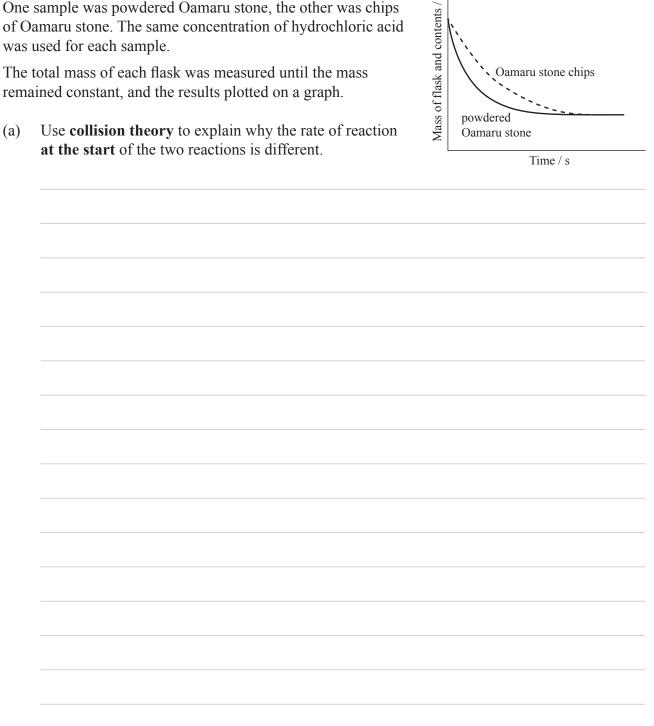
Oamaru stone chips

Source: www.sciencelearn.org.nz/images/492oamaru-stone

calcium carbonate + hydrochloric acid → calcium chloride + water + carbon dioxide

One sample was powdered Oamaru stone, the other was chips of Oamaru stone. The same concentration of hydrochloric acid was used for each sample.

The total mass of each flask was measured until the mass remained constant, and the results plotted on a graph.



ASSESSOR'S USE ONLY

c	a tauhohe te konupūmā pākawa waro, CaCO ₃ , ki te waikawa pūhaumāota, HCl, ā, ka hua nai te konupūmā pūhaumāota, CaCl ₂ .
	$CaCO_3 + 2HCI \rightarrow CaCl_2 + H_2O + CO_2$
	Whakamāramatia mai he aha i rerekē ai te ōwehenga o ngā katote konupūmā ki ngā katote būhaumāota i roto i te konupūmā pūhaumāota, CaCl ₂ , i te ōwehenga o ngā katote konupūmā ne ngā katote pākawa waro i roto i te konupūmā pākawa waro, CaCO ₃ .
I	tō tuhinga, me whakamārama he pēhea te hāngai o te ōwehenga ki te whana o ngā katote.
_	

alcium carbonate, CaCO ₃ , reacts with hydrochloric acid, HCl, to form calcium chloride, C	CaCl ₂ .
$CaCO_3 + 2HCI \rightarrow CaCl_2 + H_2O + CO_2$	
xplain why the ratio of calcium ions to chloride ions in calcium chloride, CaCl ₂ , is different the ratio of calcium ions and carbonate ions in calcium carbonate, CaCO ₃ .	rent
your answer you should explain how the ratio is related to the charge on the ions.	

TŪMAHI TUATORU

MĀ TE KAIMĀKA

I whakamātautauhia ngā mehanga rōrahi ōrite e rua o te waikawa pungatara, H_2SO_4 , mā te ranunga taetohu.

I riro mai ēnei kitenga e whai ake:

Ipurau A



 $\begin{array}{c} Whero \\ 0.01 \; mol \; L^{-1} \; o \; te \; waikawa \\ pungatara \end{array}$

Ipurau B



Karaka 0.0001 mol L⁻¹ o te waikawa pungatara

- (a) (i) Ko tēhea te ipurau he kukū rawa te mehanga waikawa kei roto?
 - (ii) Whakamāramahia he aha i rerekē ai ngā tae o ngā mehanga.Honoa tō tuhinga ki te kukūtanga o ngā katote hauwai me ngā katote waihā, me te pH o ia mehanga.

QUESTION THREE

ASSESSOR'S USE ONLY

Two solutions of equal volumes of sulfuric acid, $\rm H_2SO_4$, were tested using universal indicator. The following results were obtained:

Beaker A



 $\begin{array}{c} \text{Red} \\ \text{0.01 mol } L^{-1} \text{ sulfuric acid} \end{array}$

Beaker B



 $\begin{array}{c} Orange \\ 0.0001 \; mol \; L^{-1} \; sulfuric \; acid \end{array}$

- (a) (i) Which beaker contains the most concentrated acid solution?
 - (ii) Explain why the solutions have different colours.Link your answer to the concentration of hydrogen and hydroxide ions, and the pH of

each solution.

Ka whakahohea te waikawa pungatara ki te konukura ōkai pango, CuO, kia puta ai te mehanga konukura pākawa pungatara kahurangi, ${\rm CuSO_4}$.





Ka tāpirihia atu te konukura ōkai puehu ki te waikawa pungatara **kua whakamahanatia** kia mutu rā anō te ngaro o te konukura ōkai.



Ka tātarihia te ranunga.

	e tere ake ai te tauho kawa pungatara mak	

Sulfuric acid is reacted with black copper oxide, CuO, to make blue copper sulfate, $CuSO_4$, solution.





Copper oxide powder is added to **warmed** sulfuric acid until the copper oxide stops disappearing.

(b)



The mixture is filtered.

used, rather than c	old sulfuric aci	id.	Ton nwpp viis	1,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	warm sulfuric ac

What type of reaction is taking place between the copper oxide and the sulfuric acid?

	He whārangi anō ki te hiahiatia.	
TAU TŪMAHI	Tuhia te (ngā) tau tūmahi mēnā e tika ana.	

MĀTE
KAIMĀKA
ANAKE

		Extra paper if required.	
OUESTION		Write the question number(s) if applicable.	
QUESTION NUMBER	l	decement itemines (a) it abbitation	

	He whārangi anō ki te hiahiatia.	
TAU TŪMAHI	Tuhia te (ngā) tau tūmahi mēnā e tika ana.	

MĀTE
KAIMĀKA
ANAKE

		Extra paper if required.	
QUESTION		Write the question number(s) if applicable.	
QUESTION NUMBER		, .,	
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English translation of the wording on the front cover

Level 1 Science 2020

90944 Demonstrate understanding of aspects of acids and bases

9.30 a.m. Friday 27 November 2020 Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of aspects of acids and bases.	Demonstrate in-depth understanding of aspects of acids and bases.	Demonstrate comprehensive understanding of aspects of acids and bases.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should attempt ALL the questions in this booklet.

Pull out Resource Booklet 90944MR from the centre of this booklet.

If you need more room for any answer, use the extra space provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 3–19 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.