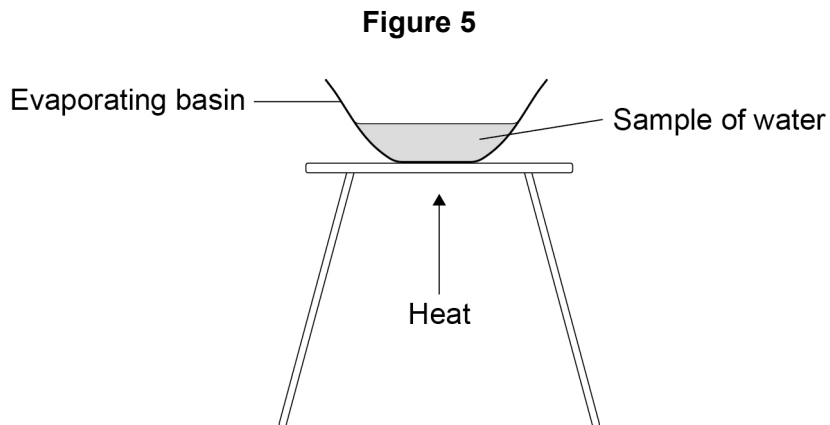


**0 3**

Some types of water contain dissolved substances.

A student investigated the mass of dissolved solids in distilled water and in sea water.

**Figure 5** shows the apparatus.



This is the method used.

1. Weigh an evaporating basin.
2. Add a sample of distilled water to the evaporating basin.
3. Weigh the evaporating basin and the water sample.
4. Heat the water sample.
5. Weigh the evaporating basin and contents.
6. Repeat steps 1 to 5 two more times.
7. Repeat steps 1 to 6 with sea water.

**0 3****1**

Give **one** safety precaution the student should take.

**[1 mark]**

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**0 3 . 2** The method used did **not** give valid results.

Which **two** improvements could the student make to give valid results?

**[2 marks]**

Tick (✓) **two** boxes.

Heat until the mass of the evaporating basin and contents does not change.

Leave some water in the evaporating basin after heating.

Record the results in a table and plot a bar graph.

Use 25 cm<sup>3</sup> of water for each experiment.

Use a beaker instead of an evaporating basin.

**0 3 . 3** A different student used a method which gave valid results.

**Table 2** shows the results.

**Table 2**

Type of water	Mass of dissolved solids in grams		
	Test 1	Test 2	Test 3
Distilled water	0.00	0.00	0.00
Sea water	0.31	0.32	0.27

The student concludes that distilled water is pure.

Suggest **one** reason why.

**[1 mark]**

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Turn over ►



Tap water is potable.

One step in producing potable water is sterilisation.

**0 3 . 4** Why is potable water sterilised?

**[1 mark]**

Tick (✓) **one** box.

To improve the taste

To kill bacteria

To remove dissolved solids

**0 3 . 5** Chlorine is used to sterilise water.

The reaction between chlorine and water is reversible.

Complete the sentence.

**[1 mark]**

Equilibrium is reached when the forward and reverse reactions  
occur at the same \_\_\_\_\_.

**0 3 . 6** The test for chlorine uses damp litmus paper.

Complete the sentence.

Choose the answer from the box.

**[1 mark]**

**blue**

**green**

**white**

When damp litmus paper is put into chlorine gas

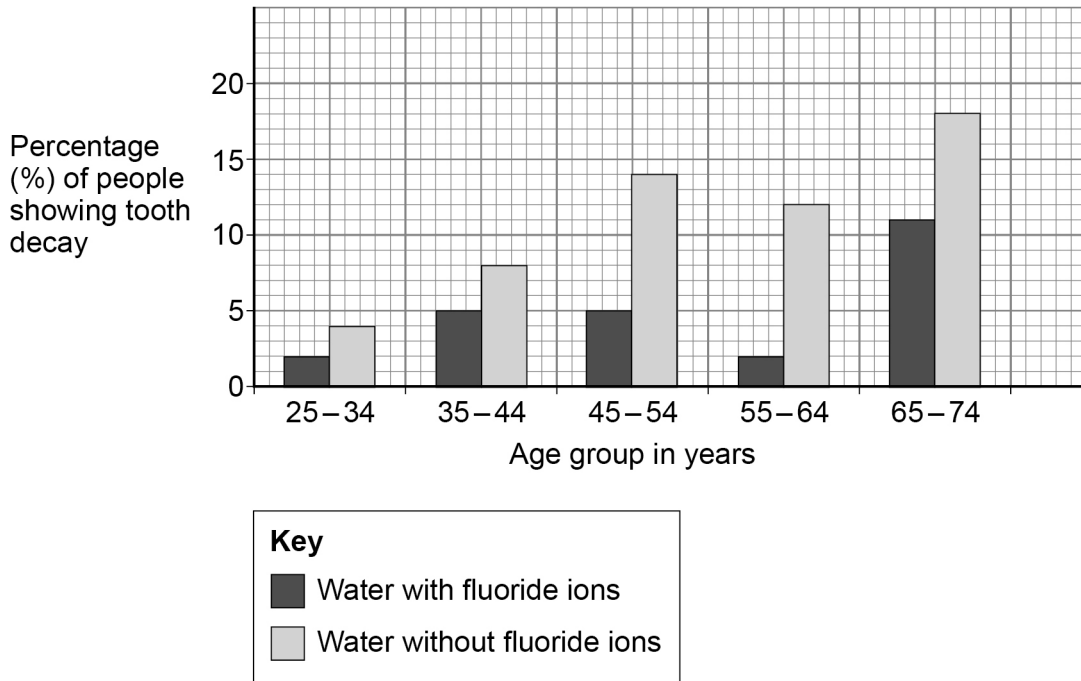
the litmus paper turns \_\_\_\_\_.



There is evidence that adding fluoride ions to drinking water reduces tooth decay.

**Figure 6** shows the percentage of people showing tooth decay.

**Figure 6**



0 3 . 7

Compare the effects of adding fluoride ions to drinking water on tooth decay in people between the ages of 25 and 74.

Use data from **Figure 6**.

**[4 marks]**

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Turn over ►



03.8

Student **A** says that water companies should add fluoride ions to all drinking water.

Student **B** disagrees.

Suggest **one** reason why Student **B** may think that fluoride ions should **not** be added to all drinking water.

[1 mark]

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12



## Question 3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	wear safety glasses / goggles	allow tie hair back	1	AO3 5.10.1.2 RPA13

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.2	heat until the mass of the evaporating basin and contents does not change		1	AO3 5.10.1.2 RPA13
	use 25 cm <sup>3</sup> of water for each experiment		1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.3	no dissolved solids (in distilled water)		1	AO3 5.10.1.2 RPA13

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.4	to kill bacteria		1	AO1 5.10.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.5	rate		1	AO1 5.6.2.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.6	white		1	AO1 5.8.2.4

Question	Answers	Mark	AO / Spec. Ref.
03.7	<b>Level 2:</b> Scientifically relevant features are identified; the way(s) in which they are similar / different is made clear and (where appropriate) the magnitude of the similarity / difference is noted.	3–4	AO3
	<b>Level 1:</b> Relevant features are identified and differences noted.	1–2	AO2
	<b>No relevant content</b>	0	
	<b>Indicative content</b>  <b>relevant features</b> <ul style="list-style-type: none"> <li>fluoride reduces tooth decay (in all age groups)</li> <li>the reduction in tooth decay using fluoride generally increases with age</li> <li>tooth decay increases in 25-54 age groups</li> <li>tooth decay decreases in 55-64 age group</li> <li>tooth decay increases in 65-74 age group</li> </ul> <b>magnitude</b> <ul style="list-style-type: none"> <li>fluoride has the least effect in the 25-34 age group</li> <li>fluoride has the greatest effect in the 55-64 age group</li> </ul> <ul style="list-style-type: none"> <li>using fluoride decreases tooth decay by 2% in 25-34 age group</li> <li>using fluoride decreases tooth decay by 3% in 35-44 age group</li> <li>using fluoride decreases tooth decay by 9% in 45-54 age group</li> <li>using fluoride decreases tooth decay by 10% in 55-64 age group</li> <li>using fluoride decreases tooth decay by 7% in 65-74 age group</li> </ul>		5.10.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.8	any <b>one</b> from: <ul style="list-style-type: none"> <li>could be a risk to health</li> <li>could have side effects</li> <li>could discolour teeth</li> <li>people should be able to decide for themselves</li> </ul>		1	AO2 5.10.1.2

<b>Total Question 3</b>	<b>12</b>
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