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**GEOGRAPHY**

**2217/23**

Paper 2

**May/June 2015**

INSERT

**2 hours 15 minutes**

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**READ THESE INSTRUCTIONS FIRST**

This Insert contains Photograph A for Question 5, Photographs B and C, Table 2 and Figs 7 and 10 for Question 7, and Fig. 13 for Question 8.

The Insert is **not** required by the Examiner.



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This document consists of **8** printed pages.

Photograph A for Question 5



Photograph B for Question 7



**Fig. 7 for Question 7****Extract from student's fieldwork notebook**Water pollution investigation – how we did the tests**Measuring the pH of water**

Use a digital pH meter at each site.

**Measuring the oxygen level of water**

Collect water from the river in a sample bottle.

Put three drops of blue dye into the river water in the sample bottle.

Store the sample bottle in a dark room.

Record how many days it takes for the dye to disappear and the water to become clear again.

If the water clears quickly it is polluted because there is little oxygen in the water.

If the water takes a long time to clear there is a lot of oxygen in the water and it is unpolluted.

**Carrying out the foam test**

Collect water from the river in a sample bottle.

Shake the water in the sample bottle for at least one minute.

This will make the water foam up.

Use a stop watch to time how many minutes it takes for the foam to disappear.

The more polluted the water the longer it will take for the foam to disappear.

Table 2 for Question 7

## Results of fieldwork

Site	Distance downstream from river source (km)	pH value	Time taken for dye to disappear (number of days)	Time taken for foam to disappear (minutes)
1	5	6.6	<b>9</b>	2
2	11	6.4	7	15
3	18	5.7	6	30
4	21	5.5	3	<b>48</b>
5	25	5.0	2	55

Fig. 10 for Question 7

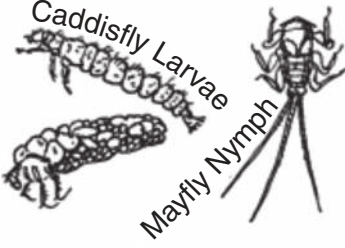

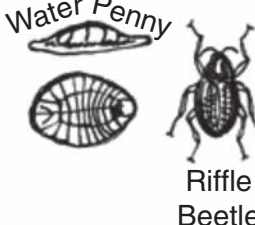






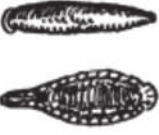

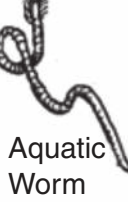



### Water pollution investigation using indicator species

Many animals which live on the river bed cannot survive where the river is polluted. The different animal species that are found in the river tell you about the quality of the water. These are called indicator species, which are shown below.

To find these animal species the river bed should be disturbed for 30 seconds by gentle kicking to dislodge the stones (this is called kick-sampling). The animals are washed into a net where they can be caught. This is shown in Photograph B on page 6. The net is then emptied into a tray in order to count and identify the species. The animals are put back in the river after they have been identified. This test is done three times at each investigation site.

The Biotic Index is used to compare the level of pollution at different sites.

#### Biotic indicator species and biotic scores

<p><b>Biotic score</b></p> <p>9 – 10</p>	 <p>Caddisfly Larvae Mayfly Nymph</p>  <p>Stonefly Nymph</p>  <p>Water Penny Riffle Beetle</p>  <p>Dobsonfly Larva</p> <p><b>Group 1</b> - These species need good quality water and do not live in polluted water.</p>
<p>6 – 8</p>	 <p>Dragonfly Nymphs</p>  <p>Damselfly Nymph</p>  <p>Crayfish</p>  <p>Fingernail Clam Scud</p>  <p>Sowbug</p> <p><b>Group 2</b> - These are species which can live in a wide range of water quality conditions.</p>
<p>1 – 5</p>	 <p>Leech</p>  <p>Midgefly Larva</p>  <p>Aquatic Worm</p>  <p>Mosquito Larva</p>  <p>Blackfly Larva</p>  <p>Snail</p> <p><b>Group 3</b> - These species can tolerate pollution and survive in poor quality water.</p>

Photograph C for Question 7



## Fig. 13 for Question 8

## Resident Questionnaire

Age group	Under 15	<input type="checkbox"/>	15 - 30	<input type="checkbox"/>
	31 - 60	<input type="checkbox"/>	Over 60	<input type="checkbox"/>
Gender	Male	<input type="checkbox"/>	Female	<input type="checkbox"/>

Question 1

What was the main reason you moved to live here?

Question 2

What are the main benefits of living here?

Question 3

What are the main problems of living here?

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