QCA
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KEY SKILLS
COMMUNICATION

Level 3 – Drinking Water

[KSC3Mr4]

Source Booklet

Tuesday 23 March 2004

- This booklet contains source material for the Level 3 Communication test, March 2004
- The test questions will be based on this material
- You must hand in this Source Booklet at the end of the test, along with your Question Paper and Answer Booklet

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The Level 3 Communication test will assess your ability to:

- select and read material that contains the required information
- identify accurately, and compare, the lines of reasoning and main points from the text and images
- synthesise the key information in a form that is relevant to the purpose
- select and use a form and style of writing that is appropriate to the purpose and subject matter
- organise relevant information clearly and coherently, using specialist vocabulary when appropriate
- ensure text is legible and spelling, grammar and punctuation are accurate so that meaning is clear

Water Gate

AS every diet book, fashion magazine and even doctor will tell us, we should be drinking more water. Two litres a day, to be precise, which works out as six to eight glasses. It's vital for all our bodily processes and, so we are told, will help us to clearer skin, brighter eyes and all-round good health.

But as you smugly reach for glass number eight, pause a moment and think what's actually in the tumbler. You might expect infinitesimal traces of lead, aluminium and other naturally occurring minerals. But Prozac? Aspirin? Powerful anti-cancer chemotherapy? Antibiotics?

As testing methods have improved, a truer picture is emerging of what actually makes its way out of our taps. The substances may be present in quantities so small that they are barely detectable – definitely within so-called "safe levels" – but more and more experts suggest these pharmaceutical residues might have a cumulative effect. "Does this harm humans? That's the $60 million question," says Canadian researcher Professor Chris Metcalfe. "I'd have to say I'm sitting on the fence. But that's not to suggest we shouldn't be more cautious. There is concern that these substances are being released into the environment. We don't know what their biological significance is for humans but we do suspect they are already having an effect on fish and wildlife."

Previous research in Germany has also shown a possibility that the heart drug clofibric acid is present in some drinking-water sources. There is concern worldwide that the water in rivers and lakes and, ultimately, going through treatment plants, could contain traces of drugs. The German finding was published 10 years ago and since then researcher Thomas Ternes has found that the amount of pharmaceuticals and personal care products entering the environment annually is about equal to the amount of pesticide used each year.

Earlier, Ternes had been surprised when he conducted tests into what happened to drugs once they left the body. Expecting to find only a few in the water he was testing, he actually detected 30 of the 60 pharmaceutical compounds he looked for.

Perhaps this isn't so astonishing. The ways drugs can make their way into our waterways are many and various. Medical and veterinary drugs are excreted in the normal way, once they have been processed in the body. There is also potentially a problem with waste from hospitals and the pharmaceutical industry. And people who think they are performing a service by flushing unwanted medicines down the loo are also contributing unwittingly to the problem.

People allergic to specific drugs might have a reaction from drinking water. Different genetic make-ups may make people susceptible to even tiny doses of a drug. And the global problem of antibiotic resistance – already blamed for the emergence of superbugs that cannot be treated with antibiotics – may also be exacerbated.

Farm animals are potentially another problem. Think of an upland reservoir and chances are you'll imagine a few dozy sheep wandering nearby. But these sheep could have been dipped in organophosphates, for example, which could similarly make their way into the reservoir.

And it's not only farmers with pesticides and sheep dips who could be altering our water's chemistry. In bathrooms across the land, those who use toothpaste with the whitener titanium oxide could be causing this chemical to form part of treated sewage sludge, which might then go on to be used as a fertiliser. Who knows whether this will then make its way into the food chain, and what effect it could have.

Caroline Evans of the Holistic Research Company agrees: "We lose eight glasses a day urinating, sweating, breathing – more if we drink fizzy drinks, alcohol, tea and coffee. We constantly need to replace this with the purest water to avoid dehydration."

Evans believes there is not enough being done at a national level to improve water quality, though she concedes that more action is being taken now than in the past.

Source: *The Scotsman* 9 October 2001

BUPA Health News

Test monitors hormone levels in our rivers

Scientists have developed a highly sensitive method of measuring levels of the female hormone oestrogen in river water following health fears about the safety of drinking water.

The technique, which was developed by a collaborative project between the University of the West of England (UWE) and the Environment Agency, can detect minute traces of oestrogen and can also determine whether it has been produced naturally or as a result of the contraceptive pill.

Dr David McCalley who led the study said: "We can now detect quantities of oestrogen down to levels equivalent to a pinch of sugar in an Olympic swimming pool." Although levels of oestrogen in rivers are minute, they have proved to be enough to cause signs of sex changes in male fish.

However, of greater concern is the possibility that these low levels of oestrogen could be reintroduced into drinking water and have a negative effect on male fertility. There has been speculation that oestrogen in drinking water is responsible for a reduction in male fertility.

Rupert Kruger, environment and scientific adviser at Water UK, which represents all UK water suppliers and wastewater operators, believes that there is no cause for alarm.

He explained, "Oestrogen is naturally produced by everyone in the population, men as well as women, and it's true that although some of it is removed by treatment works, invariably some does end up in river water. However, any water that is extracted from the surface of rivers like the Thames and is intended as drinking water, goes through a number of barriers to ensure that impurities such as oestrogen are removed to make it safe.

"We work closely with the Environment Agency and the Drinking Water Inspectorate to ensure that tap water is safe for human consumption," Mr Kruger continued.

In order to ensure absolute safety, Dr McCalley recommends that standards on maximum oestrogen levels in drinking water be introduced. He concluded, "Our detection method could certainly be used to monitor levels in drinking water…which might lead to these standards being set."

Source: *BUPA Health News* – 20 August 2001

guardians of drinking water quality
DRINKING WATER INSPECTORATE

Information Leaflet

Tap Water

In England and Wales, two thirds of drinking water comes from surface water, including reservoirs, lakes and rivers, and the rest from ground waters.

Water is treated at water treatment works before flowing through water mains, sometimes over considerable distances, to arrive at your home. Samples are taken at each stage of treatment and distribution along the way, and tested by the water company to make sure that you receive high quality water.

Water is not taken from sources that are highly polluted, and water for drinking is drawn only from good quality surface and ground water.

But all water must still be treated before it is safe to drink. Contaminants can come from agriculture or industry. They may, for example, include treated sewage effluents, and traces of agricultural chemicals in areas where farming is practised. All sources are disinfected to kill germs, known scientifically

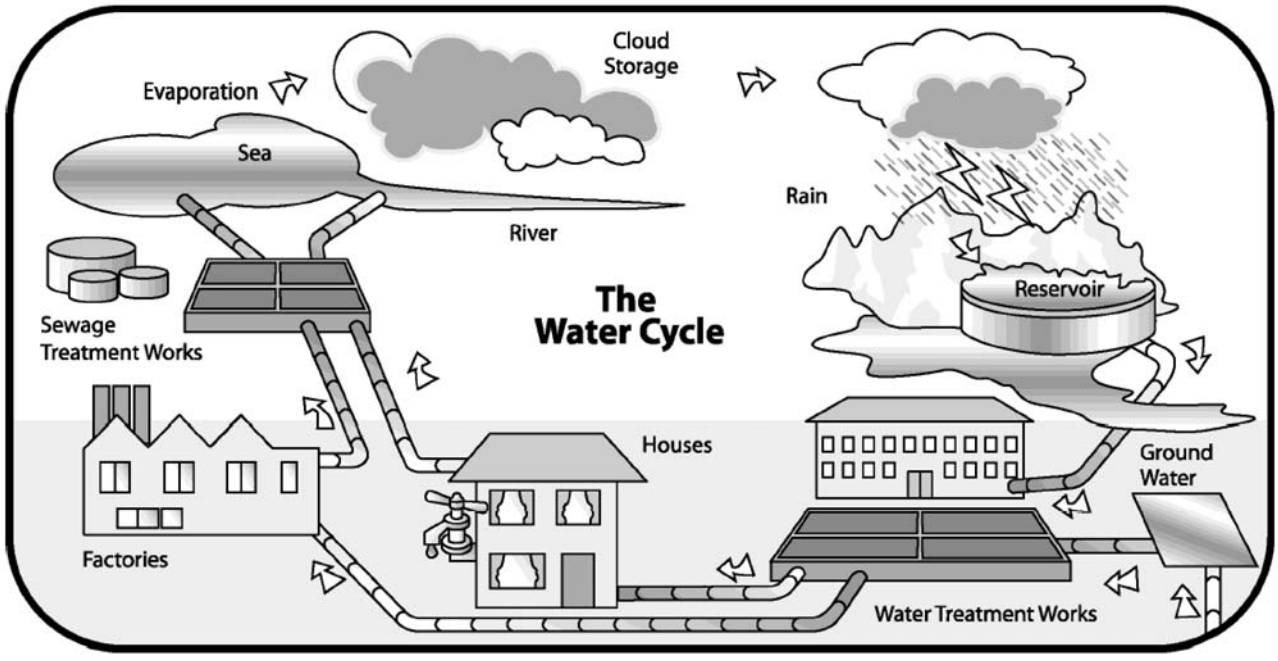

Image 1

as pathogens, which may have entered water sources from human or animal wastes.

Waters in large lakes or storage reservoirs undergo a natural purification stage – factors such as sunlight help eliminate pathogens naturally. These waters are usually retained for up to six months before being treated.

Image 2

There is a wide variety of water treatment processes available. Those used are tailored to the quality of the water source that has to be treated. Ground waters usually require very little treatment. River water tends to require more comprehensive treatment to remove chemical pollutants. All sources require disinfection with chlorine to kill pathogens, including bacteria and viruses.

Clarification is a complex process that removes silt, algae, colour, manganese and aluminium, and various other matter that may be present in the raw water. These are removed either by settling them out (sedimentation) or by using air to float them to the surface (flotation).

Filtration is also used to remove iron and manganese from ground water sources.

Disinfection is essential to eliminate any bacteria in the water. Water companies have to ensure that enough chlorine remains in the water after it leaves the treatment works to help keep the water safe on its journey to the tap. Some waters require more specialised treatment, such as:

Ion exchange is used to remove nitrate from ground water and is very similar to the process used in domestic water softeners, where water is passed through a bed of special resin particles.

Activated carbon, often in association with ozone, is used to remove organic substances. Some of these occur naturally and others are contaminants that occur because of man's activities, such as use of pesticides.

The water quality regulations set legal standards for water, which must be met by water companies in England and Wales. Most of these are based on a European Community directive, but some UK standards are more stringent. Many of the standards are based on World Health Organisation guidelines and include very wide safety margins.

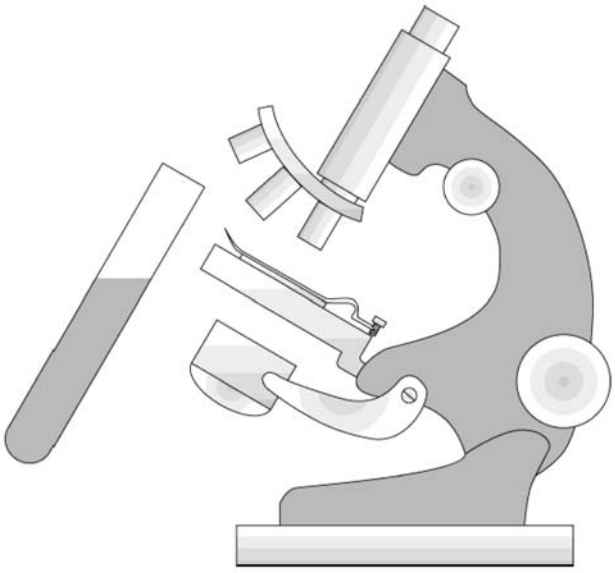

Image 3

As the 'guardians of drinking water quality', the main role of the Drinking Water Inspectorate is to enforce the regulations and check that water companies in England and Wales supply water that is safe to drink and meets the standards set in the regulations.

Source: Drinking Water Inspectorate 12 June 2001

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