

Junior Cycle Science

Assessment Task

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Introduction

Students complete a written Assessment Task to be submitted to the State Examinations Commission for marking as part of the state-certified examination for Science. It will be allocated 10% of the marks used to determine the grade awarded by the State Examinations Commission. The Assessment Task is directly related to the nature and focus of Classroom-Based Assessment 2: Science in Society Investigation (SSI). The purpose of the Assessment Task is for students to undertake a focused reflection on their individual presentation for Classroom-Based Assessment 2. The Assessment Task will assess the students in aspects of their learning including:

- Their ability to engage critically in a balanced review of scientific texts: evaluate reliability of sources, analyse and evaluate data, information and evidence, and draw valid conclusions
- Their ability to apply their learning to unseen contexts and scenarios
- Their capacity to reflect on the skills they have developed

The Assessment Task is at a Common Level and the questions posed will take into account the broad cohort of students taking the assessment. It consists of two stages: firstly, discussing stimulus material presented in a booklet form; and secondly, writing up and completing their Assessment Task booklet.

Timing of Science Assessment Task:

The Science Assessment Task will be completed during the week following completion of the Science In Society Investigation (SSI) which can take place over a 3-week period within the completion window set out in the *Junior Cycle Key dates for Classroom-based Assessment* document published annually on NCCA.ie

The Assessment Task is completed over 80 minutes within a double class period or two single class periods. The 80-minute time period is divided into two stages: The first stage (40 minutes) is used for preparation purposes; the second stage (40 minutes) is used for writing up their response to the task in the Assessment Task pro-forma booklet provided by the SEC.

Submission of booklets

The student's response is written into the pro-forma booklet and the school forwards the completed booklets for the Assessment Task in accordance with arrangements set out by the State Examinations Commission (SEC).

The mark awarded for the Assessment Task will be aggregated by the SEC with the mark awarded for the written examination to determine the overall grade for the state-certified final examination in Science.

Where a student is absent for the completion of all or part of the Assessment Task, schools should make local arrangements in the school to allow the student to complete the task as close as possible to the timeframe scheduled for completion.

Process for completing the Assessment Task:

The Assessment Task is based on the second Classroom-Based Assessment for Junior Cycle Science. This Classroom-Based Assessment, Science In Society Investigation (SSI), has two priorities: to give students the opportunity to explore a scientific topic or issue, and to develop their research and reporting skills. The SSI allows students to: search for information, discriminate between sources, document sources used, present evidence in a report, apply knowledge of science to new situations and analyse different points of view on the issue, draw conclusions and communicate opinion based on the evidence.

Students must complete Classroom-Based Assessment 2: SSI before completing the Assessment Task.

First stage (Class period 1): Discussion and reflection (40 minutes)

Discussion will be based on the stimulus material booklet available (see Appendix 1)

The teacher will arrange the students into groups and present the Stimulus Material Booklet. They will ask the students to read and discuss the information presented in the booklet, prompt questions are included in therein to help shape the discussion.

Second stage (Class period 2):

Completion of assessment task booklet and submission (40 minutes) Completion of the assessment task booklet (Recommended time of approximately 35 minutes)

The completion of the assessment task booklet can be done during the next timetabled Science class period you have with the class group. The writing up of the booklet should last for 35 minutes approximately. Students should have their individual SSI with them as the questions they will be asked refer to their individual SSI. Students complete the booklet independently, whilst teachers supervise without intervention/assistance, except where support is required to remove barriers to learning, in line with the supports available to the student(s) throughout the school year.

Submission (up to 5 minutes)

Students label their answer booklets clearly and the teacher follows school procedures for storing/submitting booklets to the State Examinations Commission.

Checklist for teachers

Before:

- Have a copy of the Stimulus Material Booklet available to you and the students

During the First Stage (Class Period 1):

- Allow time for group discussion based on the Stimulus material Booklet (Class Period 1)
- Ensure students have their individual Science In Society Investigation available to them. During the Second Stage (Class Period 1):
- Allow time for quiet reflection on students' individual presentations and support materials.

During the Second Stage (Class Period 2):

- Supervise as students write their answers into the booklet.

After:

- Gather all clearly labelled booklets and then follow established school procedures for storing/submitting material to the SEC.

Note: If your students are completing the Assessment Task during a double class, the same steps outlined above apply but are completed back to back over 80 minutes of one double class period

Stimulus Material Booklet

Nitrates in drinking water

Key Questions...

Where does Nitrate come from?

How do you know if water is polluted?

Is there nitrate pollution in water in Ireland?

What are the human health risks of nitrates in our water?

Should Industries be forced to monitor their contribution to water pollution?



Group Discussion

Nitrates in drinking water

Instruction:

This booklet presents information about water polluted by nitrates. Follow your teacher's directions to work as a group. Read and discuss the information presented in a variety of ways;



Newspaper
Article



Text



Diagram



Map



Table

Use the prompt questions on page 9 to help shape your discussion.



Newspaper article

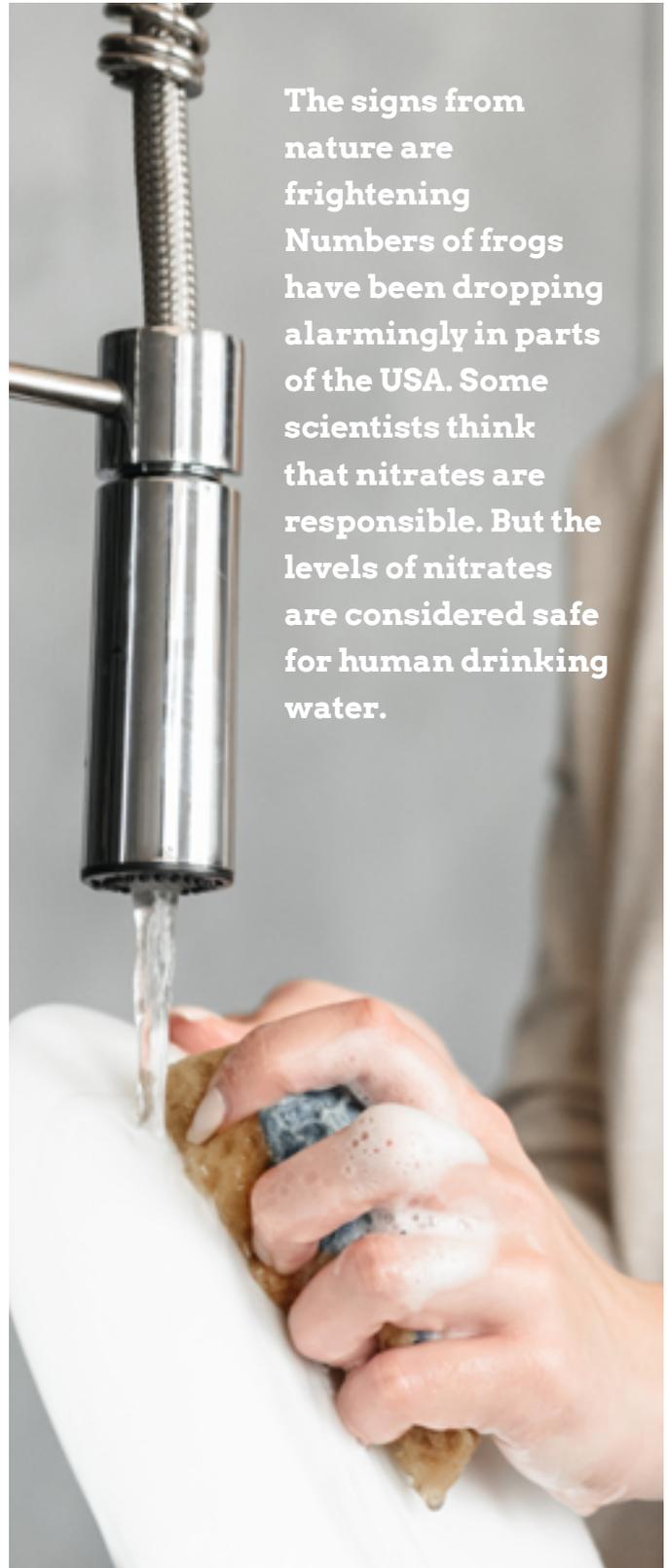
DO YOU KNOW WHAT YOU'RE DRINKING?

Water makes up $\frac{3}{4}$ of your body. So you want to be sure that what you drink is safe. The problem is we use too many chemicals these days, on our fields and in our factories. It is inevitable that tiny amounts will get into our drinking water.

One of the most worrying chemicals is nitrates. Nitrates come from fertilisers used to make crops grow better. Nitrates can run off the fields, into our rivers, and into the water supply. There have been many suggestions that nitrates can harm human health.

High levels of nitrates might possibly cause children to get the disease diabetes. In diabetes the blood carries too much glucose. The body cannot process it properly. Diabetic children will have to suffer a lifetime of daily injections to treat it. Other research has suggested a link between high nitrate levels and a form of cancer. So far scientists have not proved that nitrates are dangerous. But they have not proved they are safe either.

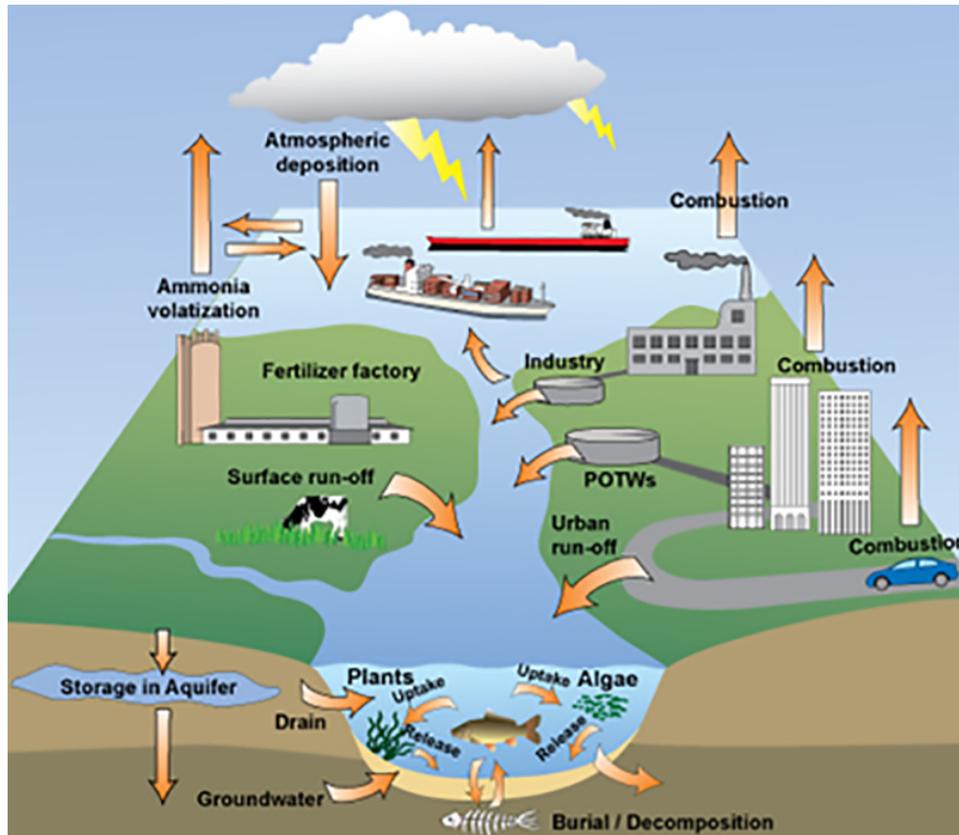
Are you happy drinking water that kills off frogs?





Diagram

Overview of the nitrogen cycle and sources of pollution with nitrogen



Source: <http://lifeofplant.blogspot.com/2011/03/nutrient-cycling.html>

Table

Information on Drinking Water Standard

Environmental Protection Agency	Parameters of water quality for nitrates (mg/l)
United States	< 10 mg/litre
European Union	<50mg /litre

Data supplied by the US and EU Environmental Protection agencies

Table

Information on a study of 214 cases of Blue-baby syndrome reported in the US.

Nitrate concentrations in the water consumed by the infants	Number of cases of Blue-baby syndrome
Nitrate levels < 10mg/l	0
11mg/l < Nitrate levels < 20mg/l	5
21mg/l < Nitrate levels < 50mg/l	36
Nitrate levels > 50mg	173

Source: *American Scientist*

Text

Information about water polluted by nitrates

Overall, the quality of water in Ireland is still quite good compared to other countries. Over the past thirty years, however, water quality has decreased and many incidences of pollution have cropped up. The pollutants of most concern to groundwater in Ireland are Nitrates from fertiliser used on land. The diagram above gives an overview of the nitrogen cycle and sources of water pollution with nitrogen in Ireland.

From *Water Quality in 2016 An Indicators Report*
European Environment Agency

 In 2016 the mean nitrate concentration at six monitoring sites exceeded the Irish groundwater threshold value, with two sites having mean concentrations greater than the Drinking Water Standard. - *Water Quality in 2016 An Indicators Report* European Environment Agency

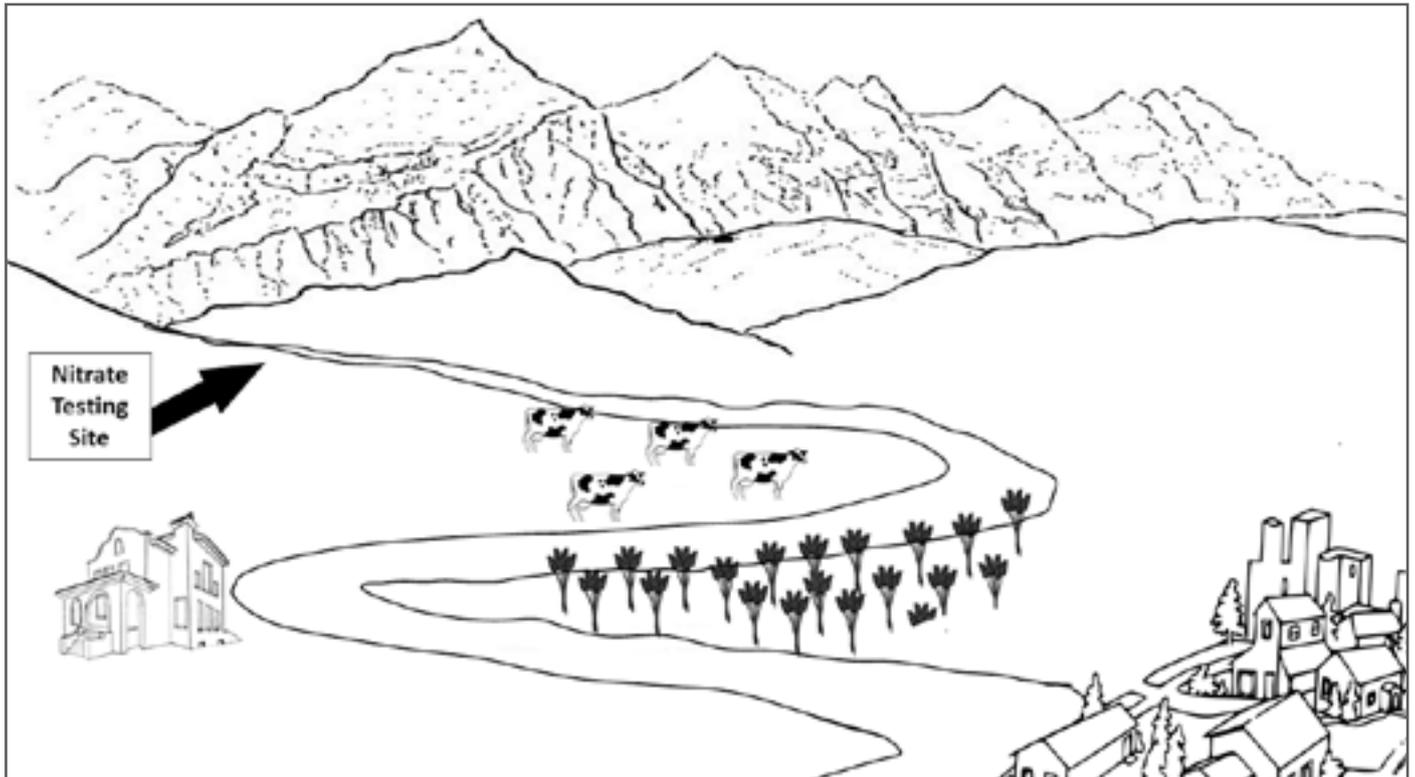
 In Ireland in 2017, 7010 farmers applied for a **Nitrates Derogation** to the Department of Agriculture, Food and Marine. If granted, the derogation means they may increase the amount of livestock manure nitrogen they use beyond the EU limits set to protect drinking water supplies from nitrate pollution. - Agriland.ie





Map

A map showing the water testing location on the river supplying water to the group water scheme in Kilronan, a town in the midlands in Ireland.





Table

Data on Nitrate levels in the Kilronan Group Water Scheme

Scientists working for **Kilronan Water** recorded the nitrate concentration of one hundred water samples taken from the river over a 4 month cycle. This information is shown in the table below:

Data on Nitrate levels		Kilronan Water
Day of cycle	Sample data	Nitrate concentrtration in mg/l
5 March	5	48.3
8 March	8	43.3
24 March	24	44.4
9 April	40	44.7
12 April	43	51.8
28 April	59	43.5
6 May	67	43.8
17 May	78	23.9
25 May	86	41.8
8 June	100	40.9

Scientists claim the water is safe to drink and no action needs to be taken to remove nitrates from the water supply.

Group Discussion

Prompt questions for group discussion

- Should people worry after reading the newspaper article? Discuss.
- What opinion does the newspaper article have about nitrates? Do you think this opinion is biased? Discuss.
- Look at the map. Do you think the map is easy to interpret?
- Is a map a good way to communicate information about testing water for nitrates? Discuss
- If you were the scientist carrying out this test, where would you have placed the testing centre? Discuss.
- Look at the information about the concentrations of nitrate in the water supply. Should the people using this supply have concerns? Discuss.
- As an independent reviewer, would you be satisfied with the evidence that the scientist produced to support the claim by the water company that the water does not pose a threat to health? Discuss