

What are Phytoplankton?

Phytoplankton, better known as algae, are tiny plants found free-floating in lakes throughout Ireland. They are very small and many of them can only be seen with a microscope. They require sunlight to turn carbon dioxide and water into food and energy through the process of photosynthesis. They are an important part of the food chain providing the main source of food for both zooplankton and fish.

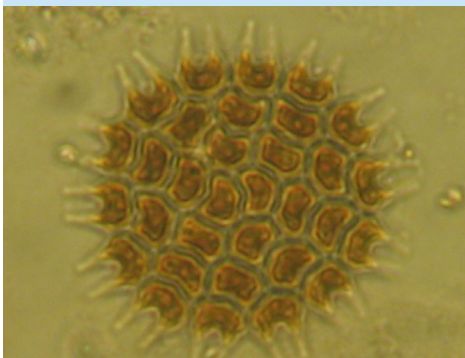
Some common freshwater phytoplankton groups include:

- Blue-green algae (Cyanobacteria)
- Green algae
- Diatoms
- Dinoflagellates



What do Phytoplankton look like?

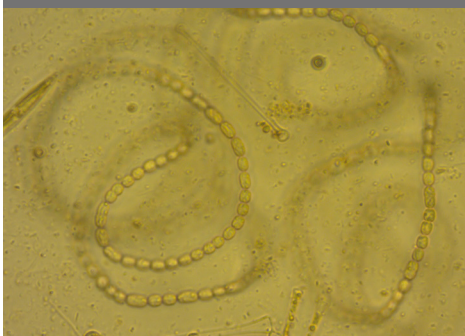
Have a look at the photos below. These include some of the common phytoplankton found in Irish lakes.



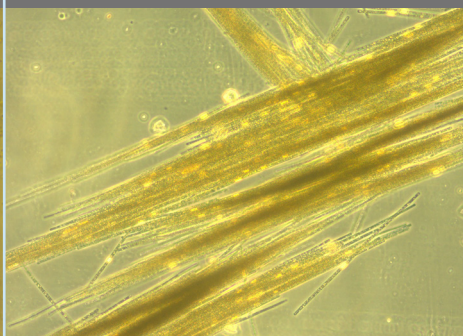
Pediastrum is a green alga ©APEM



Cryptomonas is a cryptomonad and has two flagella (small hairs) attached to a flattened oval cell ©APEM



Anabaena is a planktonic blue-green alga ©APEM




Aphanizomenon is a common bloom forming blue-green alga ©APEM



A lake **phytoplankton** bloom

A single drop of water can contain thousands of individual phytoplankton cells. Some phytoplankton occur in such large amounts that they cause blooms which often give the water a 'pea soup' appearance. These blooms can have an effect on recreational activities such as fishing and swimming.

What factors control their growth?	Can they be used as an indicator of water quality?	How do we monitor phytoplankton?
<p>Many environmental factors influence their growth but here are some of the most important:</p> <ul style="list-style-type: none"> • Nutrients • Sunlight • Temperature <p>Phytoplankton are more common in the spring and summer when increased day length and warmer water temperatures create conditions more favourable for their growth.</p>	<p>Yes, phytoplankton are sensitive to changes in the condition of lakes.</p> <p>In lakes with high nutrient concentrations certain phytoplankton species are more likely to occur. The presence of these indicator species can be used to assess the ecological health of a lake.</p> 	<ul style="list-style-type: none"> • Two samples are collected in the summer from monitored Irish lakes. • The samples are preserved, and the phytoplankton species later identified in the laboratory using a microscope. • Chlorophyll (a pigment present in green plants) is measured in the laboratory to determine the amount of phytoplankton (biomass) present in the lake.

How are the results used to assess lake quality?

The Water Framework Directive requires us to determine the ecological status of Irish lakes by looking at their biology. One of the ways we can do this is by studying the phytoplankton.

The Irish Phytoplankton Index was developed for Irish lakes for this purpose. The index combines information about:

- **Phytoplankton biomass** - the amount of phytoplankton measured using chlorophyll and;
- **Phytoplankton species** - using indicator species that include green and blue-green algae and diatoms.

The numbers of indicator species are combined with the amount of chlorophyll to give us a score which allows us to categorise the lake water quality into five status classes as shown below.

'High' is the best water quality and 'Bad' is when the water is most polluted.



For the latest information go to www.catchments.ie and <https://gis.epa.ie/EPAMaps/>
The lake monitoring fact sheet can be found at <http://www.epa.ie/irelandsenvironment/getinformed/infographics>