What are algal blooms?  
What makes them harmful?  
There are many species of single-celled organisms living in the Great Lakes, including algae. When certain conditions are present, such as high nutrient or light levels, these organisms can reproduce rapidly. This dense population of algae is called a bloom. Some of these blooms are harmless, but when the blooming organisms contain toxins, other noxious chemicals, or pathogens, it is known as a harmful algal bloom, or HAB. HABs can cause the death of nearby fish and foul up nearby coastlines, and produce harmful conditions to marine life as well as humans.

Blue Green Algal Blooms  
Blue-green algae are the most common, but not the only group of algae to form HABs. Blue-green algae are actually bacteria (cyanobacteria) which are able to photosynthesize, hence the green color. Cyanobacteria live in terrestrial, fresh, brackish, or marine water. They usually are too small to be seen individually, but sometimes can form visible colonies. Some cyanobacterial blooms can look like foam, scum, or mats on the surface of fresh water lakes and ponds. The blooms can be blue, bright green, brown, or red and may look like paint floating on the water. Some blooms may not affect the appearance of the water. As algae in a cyanobacterial bloom die, the water may smell bad. If you detect an earthy or musty smell, taste or see surface scum's of green, yellow or blue-green, the water may contain blue-green algae. Only examination of a water sample under the microscope will confirm the presence of blue-green algae.

Are all algae poisonous?  
What species are poisonous?  
There are many species of algae, and most do not produce toxins. It is important to remember that algae are a natural part of our water ways. However, all blue-green algae, or cyanobacteria, can produce skin irritants under certain conditions, and some can produce multiple types of the more harmful toxins. The most common species of toxic cyanobacteria in the Great Lakes are:

- *Microcystis aeruginosa*
- *Anabaena circinalis*
- *Anabaena flos-aquae*
- *Aphanizomenon flos-aquae*
- *Cylindrospermopsis raciborskii*
Toxins Produced by blue green algae
Blue-green algae can produce a wide array of neurotoxins, liver toxins (hepatotoxins), cell toxins, and skin irritants. Neurotoxins include anatoxin-a, anatoxin-a(s) and saxitoxin, and are commonly produced by the *Anabaena* and *Oscillatoria* species. Consumption of large amounts of these toxins by animals or humans can result in muscle cramps, twitching, paralysis, and cardiac or respiratory failure.

Hepatotoxins (liver toxins) include microcystin and cylindrospermopsin, and are produced by the *Microcystis* and *Cylindrospermopsis* species. These toxins produce symptoms including nausea, vomiting, and acute liver failure.

Dermatotoxins (skin irritants) include aplysiatoxin, lyngbiatoxin-a, and lipopolysaccharides. Nearly all blue-green algae produce dermatotoxins. These toxins produce symptoms including skin irritation, rashes, and gastrointestinal distress. Sensitivity to these toxins varies widely among individuals.

<table>
<thead>
<tr>
<th>TOXIN</th>
<th>ACUTE EFFECT</th>
<th>SYMPTOMS</th>
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<tbody>
<tr>
<td>Anatoxin-a</td>
<td>Neurotoxicity</td>
<td>Not documented</td>
</tr>
<tr>
<td>Anatoxin-a (s)</td>
<td>Neurotoxicity</td>
<td>Not documented</td>
</tr>
<tr>
<td>Cylindrospermopsin</td>
<td>Hepatotoxicity, renal</td>
<td>Enlarged liver, malaise, anorexia, vomiting, headache.</td>
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<td></td>
<td>toxicity, chromosome</td>
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<td></td>
<td>breakage, aneuploidy</td>
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<tr>
<td>Microcystin</td>
<td>Hepatotoxicity</td>
<td>Paresthesia and numbness of lips and mouth within ½ to 3 hours after exposure, extending to face, neck, extremities; motor weakness; incoordination; respiratory and muscular paralysis.</td>
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</tbody>
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For more information on Harmful Algal Blooms, http://www.glerl.noaa.gov/res/Centers/HumanHealth/hab/EventResponse/

If you experience any of these symptoms, call your physician or the National Emergency Poison Control Hotline IMMEDIATELY.

POISON CONTROL HOTLINE 1- 800-222-1222