



Collecting Water Samples Answer Key

Graph 1

1. What happens to the nitrate concentrations at a depth of 5 meters in Flathead Lake from June to October?

The amount of nitrate at 5 meters depth in Flathead Lake dramatically drops from June to October. During late August to October the concentration of nitrate is virtually zero.

2. What happens to the nitrate concentrations at a depth of 90 meters in Flathead Lake from June to October?

The amount of nitrate at 90 meters depth in Flathead Lake increases from June to October, to around 80 ug/L.

3. What may cause this difference in nitrate concentrations between depths of 5 meters and 90 meters (hint: it has something to do with living organisms)?

Nitrate is one of the two important nutrients that phytoplankton use to survive. During the summer when phytoplankton populations are higher, phytoplankton consume the nitrates in the top few meters of the lake. Because of this consumption, the nitrate values essentially decrease to zero. The nitrate concentrations at depth (90m) increases. The thermocline that forms in Flathead Lake during the summer creates a barrier that prevents nitrate in the bottom waters from mixing into the surface waters. Dead organisms sink to the bottom waters and decomposition adds more nitrate back into these waters.

Graph 2 and 3

1. A.) During what month(s) did Flathead Lake have the most total phosphorus?

Flathead Lake had the most phosphorus in May.

- B.) During what month(s) did the Flathead Lake Tributaries have the most total phosphorus?

The Flathead Lake Tributaries had the most phosphorus in May, with June coming in a close second. The Flathead River has substantially more phosphorus than the Swan River. The Swan River had much more consistent values of phosphorus throughout the year compared to the Flathead River.





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2. Why do you think the total phosphorus amounts are highest during these months? (Think of environmental events that may be happening during this time of year).

The phosphorus values are the highest during May and June because of precipitation. May and June tend to be rainier months in this area and the increased precipitation causes more sediment and nutrients to wash into waterways including the Flathead Lake tributaries and Flathead Lake. Additionally, during May and June temperatures start to warm up enough to increase snowmelt at higher elevations, and as this snow melts, it puts a lot more water into the waterways and picks up nutrients along its path to Flathead Lake. Many of these nutrients are coming from water running over farmland that is rich with fertilizer. Many fertilizers used on farmlands contain phosphorus and nitrogen. With increased precipitation in the spring, more fertilizer is washed off of farmlands and into waterways.

3. What other ways do you think phosphorus could get into the lake?

Human and animal waste also contribute phosphorus in lakes and streams. While animal waste can easily wash off of surrounding land when it rains, human waste tends to enter lakes, like Flathead Lake in a different way. Many homes around Flathead Lake aren't connected to city sewer systems and instead have a septic system to treat their waste (look at Septic Systems and Flathead Lake document to learn more). A large number of these septic systems are old and failing, potentially resulting in human waste entering into Flathead Lake.

