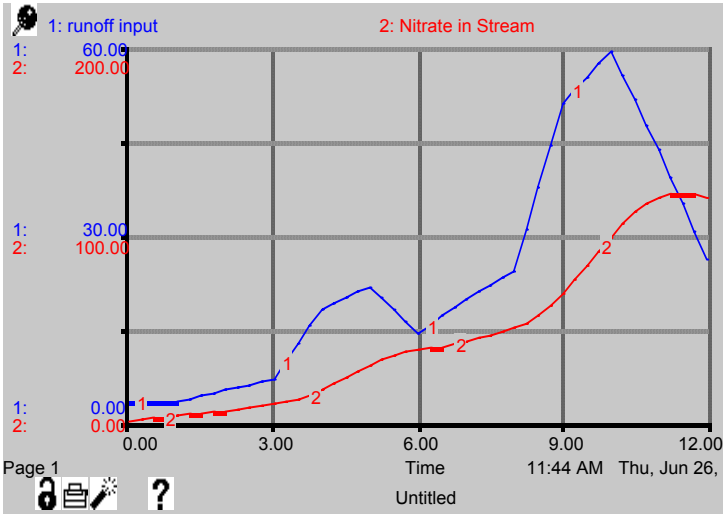
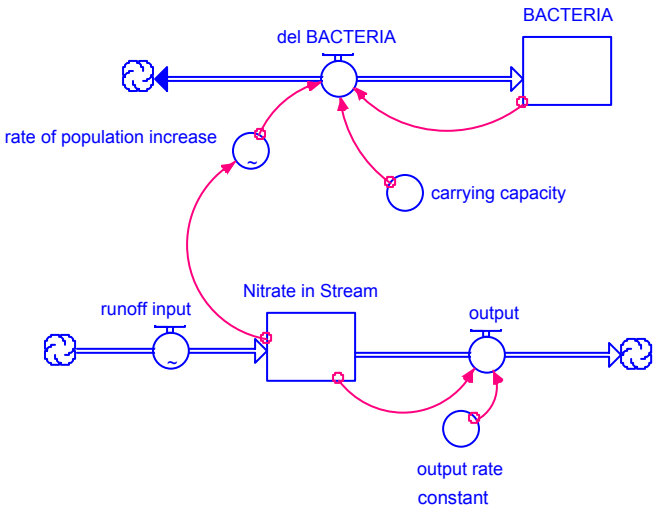
Dynamic Visualization of Vermilion County Water Quality

Research Background Information: Allow students to research the many factors involved in water quality assessment and in particular the potential issues of greatest concern to the local community. (Fertilizer runoff, NO_3^-, PO_4^{-3} eutrophication, dissolved oxygen, algae and bacteria) Why are these issues important? Also, with the help of scientists from the United States and Illinois State Geological Surveys, try to obtain web published chemical/biological water quality information for a water supply in your area.

Create Experimental System: Facilitate the creation of classroom aquaria in which students can manipulate controlled systems in an effort to understand the relationships between various experimental parameters and visualize daily changes in water quality. * For more information please see:
http://gk12.ncsa.uiuc.edu/Winkler_Method.pdf or http://gk12.ncsa.uiuc.edu/teams2002.html

Challenge experiment: Given a representative range of existing nutrient concentrations in the Lake Vermilion Watershed encourage students to create an experimental system to monitor changes in water quality as a function of time and nutrient levels. Measurement of parameters such as bacterial population and dissolved oxygen will need to be taken repeatedly (e.g. every two days for the duration of a month long study) and must be analyzed with EXCEL as a function of nutrient concentration in order to see variation within the experiment. These results would then allow students to understand the dynamic behavior of the controlled system and facilitate the creation of a STELLA model, with the help of an instructor, which could predict how water quality changes in a watershed over time in response to various fluxes of nutrients.





Long Term Geostatistical Approach:

In coordination with other programs such as ArcGIS, students could create a three dimensional picture of water quality in the watershed over time, given the USGS supplied data and the data obtained from the STELLA model.