**Investigating Microbial Contamination in Snapfinger Creek**

 **Instructor Guide**

# **Background**

This activity can be implemented in a general biology, microbiology, and environmental science lecture or lab course. This activity requires 1 to 3 days of instruction, depending on the amount of class time available and the students’ knowledge of Excel. While students do not have to be experts in microbiology, it is helpful to have a basic understanding of the terms and techniques so that data will have meaning beyond just a plotting exercise. If necessary, due to time constraints, you may choose to assign one of the days as an out of class assignment. If necessary, due to time constraints, you may choose to assign one of the days as an out of class assignment or combine Days 1 and 2. A proposed class schedule is provided.

# **Schedule**

This is a proposed schedule for the project. You may choose to alter the schedule depending on your time constraints.

**Day 1**

* Introduce the project
	+ Present the Water Quality PowerPoint presentation
	+ Explain the purpose behind the project and activities that will be done over the next two class periods.
		- Discuss the importance of water quality in residential, commercial, and natural supplies.
* Assign the students the EPA research paper to review, have them research local sewage spills, and complete the practice Excel activity to generate a scatter plot and an additional graph of their choice. (In-class assignment or homework)
	+ Students can complete these activities outside of class.
	+ Consider awarding extra credit to encourage the students to complete the tasks.

**Day 2**

* Review the research paper and local sewage spills
	+ If students are unfamiliar with microbiology plating and counting techniques, such as plate count (PC) and most probable number (MPN) analysis, review those concepts.
* Review the Excel Activity
	+ Assist students who may have struggled with generating the Excel scatter plots.
* Complete Part A of the Activity
	+ The teacher will lead the class through each activity. Each activity will be allotted 15-30 minutes.
		- Student progress and feedback will be provided for the section

**Day 3**

* Complete Part B of the activity
	+ The teacher will lead the class through each activity. Each activity will be allotted 15-30 minutes.
		- Student progress and feedback will be provided for the section
* Complete Part C of the Activity
	+ - Student progress and feedback will be provided for the section
* The class will debrief on the activity for the last 15-20 minutes of class
* Students will submit their handouts for grading.

# Excel Plotting Practice Guide

This guide is provided as a tool to help students practice their Excel plotting skills. The document was created using a PC, so additional instructions will be needed for MAC users. Students can also use Google Sheets if they do not have access to Microsoft Office. Depending on students’ level of Excel expertise, you may choose to use or omit the practice guide. Please review the guide with the students and address any questions to avoid the activity turning merely into a frustrating Excel activity.

# Student Handout Key

The key student handout key is provided as an additional document.