SITE SAMPLE STUDY

EDUCATOR INSTRUCTIONS

STREAMS

OR

Timeline: 75 minute classroom period and 30 to 60 minutes of field work

TABLE OF CONTENTS

Site Sample Study Journal

EDUCATOR COPY **OR**

Learning Goals for Students

- Learning Goal 1: Applying and using the appropriate terminology, concepts, ideas, and themes related to environmental toxicology and the high school biotechnology kits.
- Learning Goal 2: Conducting inquiries by selecting the appropriate instruments and materials as well as following the methods, techniques, and procedures for each study.
- Learning Goal 3: Applying safe lab and/or field practices and procedures, handling and storing lab equipment, as well as using appropriate personal protection.
- Learning Goal 4: Ability to compile, verify the accuracy, interpret, analyze, and communicate the results collected from various studies and experiments using the appropriate significant figures and units of measurement.

Before reading further, please note the following

This task can **ONLY** be performed if you are working under the **Water** or **Soil** streams.	This assignment can **ONLY** be done if they are using one of the following high school biotechnology kits: Muta-Lab™ (Water stream)	Toxi-Lab™ (Water stream)	Coli-Lab™ (Water stream)	Sedi-Lab™ (Soil stream)

Expectations

Conducting field research to acquire samples for experiments are key components to being an environmental toxicologist. Collecting site samples is an important initial step because it provides a visual validation of whether the site(s) are safe for further development or remediation. Awareness of your surroundings and practicing safe methods are also critical for a successful study. The objective is for your students in their lab groups complete a site sample study where they will acquire sample(s) for the assigned high school biotechnology kit. They will submit their site sample study journal to you for assessment and evaluation.

Instructional Guidelines

Dividing the Class into Groups and Introduction

If you have not done this already for the high school biotechnology lab experiment, have the students divide themselves into groups of three to four. Provide the student groups the handout entitled '*Site Sample Study Journal*' (***** see below) to complete the site study. Acquiring the samples will not take long (no more than approximately 30 to 60 minutes), it is simple, and you will not need extensive supplies or equipment.

(*) About the '*Site Sample Study Journal*'

Before providing the '*Site Sample Study Journal*' handout to students, you need to let students know which of the column titles they need to add to their chart (the chart in question is located in the **bottom of page 4** of the student handout). This is dependent on the stream you are working on (either Soil or Water).

If you are doing the **Water Stream (Muta-Lab™, Toxi-Lab™, or Coli-Lab™)**, the students will need to label the Site Samples Data Chart with the following (highlighted):

Sample #	Turbidity	pH	Temperature (°C)	Salinity	Photo (Y)	Notes

If you are doing the **Soil Stream (Sedi-Lab™)**, the students will need to label the Site Samples Data Chart with the following (highlighted):

Sample #	Substrate Type (Clay, Silt, Fine or Coarse Sand, Gravel)	Soil Composition (Colour, Wet or Dry, & Other Notes)	Vegetation Cover (0%, < 25%, 26-50%, 50-75%, >76%)	Photo (Y)	Notes

Acquiring the Samples

Once the students are in their groups, you will need to decide on the arrangements of acquiring the sample(s).

Option A: You will assign each of the groups a site to acquire sample(s) for the lab experiment.

OR

Option B: In a class discussion, each student group will select a site to acquire sample(s) for the lab experiment with your permission.

Once that is done, decide yourself or with the class how the samples will be acquired. Please note that the assumption used is that you will have six groups of three to four students each.

Important Notes:

- Read the '*Preparation*' handout of each of these high school biotechnology kits for further information of preparing the samples before the lab experiment.
- Have students read and bring with them a copy of the '*Field Work Guidelines*' when acquiring the sample(s).

Field Work Options and Samples Requirements

Once you know which option you will pursue, you can organize the sample collecting with the following two choices:

Option 1: Organize a Field Trip to a Site

You can organize a field trip to travel to a particular site that would be reasonably close to your school (within a 1 hour drive). Ensure that it will be ok for a class to travel to that site. Sometimes, those sites are being studied by other organizations or institutions. Reach out to them if they can assist you.

Option 2: Students going to their own Sites

Students can go on their own to a site or sites to acquire samples. If this option is done, it is very important to have students read the '*Field Work Guidelines*' for safety guidelines, instructions, and tips of how to acquire their samples. Students should also travel together and with appropriate supervision. Make sure that you know where the students are going and have a map with the site locations. This will help the class when they are finishing their assignments.

The diagram below shows the volume or mass of samples required for each high school biotechnology kit.

Muta-Lab™	**Toxi-Lab™**	**Coli-Lab™**	**Sedi-Lab™**
Per Group: 1 sample of 15 mL or 15 g (0.5 oz) 6 Groups: 6 samples of 90 mL or 90 g (3 oz)	Per Group: 3 samples of 3 mL or 3 g each (total of 9 mL or 9 g) 6 Groups: 18 samples of 54 mL or 54 g	Per Group: 1 sample of 30 mL to 60 mL (1 oz to 2 oz) 6 Groups: 6 samples of 180 mL to 360 mL (6 oz to 12 oz)	Per Group: 1 sample of 5 g 5 Groups: 5 samples of 5 g each (total of 25 g)

After the Field Trip or the Day after the Students acquired their Samples

Once the student groups acquired their sample(s), they will submit the sample(s) to you to prepare for the lab experiment.

See the '*Preparation*' handout of each of the high school biotechnology kits for further information of preparing the samples before the lab experiment.

Students will also submit their '*Site Sample Study Journal*' to you for assessment and evaluation.