

What's Your Risk?

Total Number of Lessons: 3

Total Estimated Time for Module: 270 minutes

SECTION 1: MODULE OVERVIEW AND CURRICULAR CONNECTIONS – REQUIRED

- **Module goal:** At the end of this module, students will have an understanding of how their environment can affect not only their own genetics, but their environment. They will gain technology skills using Google Sheets and learn best practices when it comes to representing data.

- **Connection to standards:**
 - Current Indiana Standards
 - SEPS.1
 - SEPS.2
 - SEPS.3
 - SEPS.4
 - SEPS.5
 - SEPS.6
 - SEPS.7
 - SEPS.8
 - B.1.2
 - B.3.2
 - B.4.1
 - B.4.2
 - B.4.3
 - B.4.4
 - B.4.5
 - NGSS (New Indiana Standards starting fall 2023)
 - HS-LS1-1
 - HS-LS2-7
 - HS-LS3-1
 - HS-LS3-2
 - HS-LS4-6

- **RET materials/ideas to be leveraged:**

Dr. Kumar taught us how to navigate beginner Python using various forms of data. This got me interested in how I can have my students represent the data they will collect as a whole. Ideally, my students would learn how to create a geo chart map and can incorporate that into their completed projects.

SECTION 2: OVERVIEW OF MODULE FRAMEWORK – REQUIRED

UNIVERSITY OF NOTRE DAME

Center for STEM Education

107 Carole Sandner Hall, Notre Dame, IN 46556 <http://STEMeducation.nd.edu>

- **Real-world context:**

While lead is naturally occurring, it is a toxic metal and has resulted in irreversible cognitive damage for both animals and humans. Lead contaminated waste needs to be disposed of appropriately, otherwise other situations like Flint, MI will continue to happen.

- **Possible Lesson Ideas:** Students will have 1-2 class periods to learn about what lead is using guided notes made using Canva. Basic resources will be provided to them via QR codes on their notes and they will practice note taking skills from videos, articles, and educational websites.

- **Background STEM content:**

Students will need to have a basic understanding of the process of DNA replication and protein synthesis. Those proteins will in turn code for the various traits, but what happens if there is an error in the code? This is something that students are going to learn about. Additionally, students will need to have a basic understanding of ecological impacts. Most students will have learned about ecology in elementary school and possibly middle school. The project they will work on in class will likely happen before we jump into our ecology unit, though, as standardized state testing will coincide with much of the timeline.

- **Possible Lesson Ideas:**

In order to for students to learn about DNA replication, which will likely happen in the fall semester, they will learn just as Watson and Crick did by begging, borrowing, and stealing information to create a DNA structure using LEGO in class. Once they have mastered the basic structure of DNA, they are ready to move onto how DNA is replicated. They will have various coloring activities to help them remember which bases pair up together. Since we will likely not get super in depth with ecology prior to the “What’s Your Risk?” project, students will have a few Canvas Studio video quizzes to work through and will need to ascertain a cut score of at least 80% before moving onto their project.

- **Description of Main Activity/Project:**

The main activity that students will be working in is how lead impacts ecology and genetics. They are able to choose which of those topics interests them the most.

- **Possible Activity/Project Ideas:**

Prior to learning about what lead is, they will be able to submit any questions they have about what lead is for a nurse practitioner to answer. On the intro to lead days, students will be able to work in groups of 2-3. They will all still be expected to complete their own notes. Once students have learned some basic

information on what lead is, they will need to collect water samples in three different areas of their choosing and note the GPS coordinates of each sample. In class, they will each get to test their samples for lead and input their readings and coordinates into a Google Form that will be turned into a spreadsheet, once all data has been collected. Each student will need to complete their own project over how lead has ecological or genetic impacts once all of their data has been collected and will need to represent the data that's been collected in class.

Projects will be put on display in the hallway for a museum walk where students can learn from their classmates.

SECTION 3: MODULE SEQUENCING AND ASSESSMENT – REQUIRED
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- **Brief description of sequenced learning objectives:**
Learning objectives will build upon themselves as the biology content students are learning in class goes from micro to macro.
- **Brief description of formative and summative assessment approaches:**
Formative assessments will happen throughout the project – even beginning at the note taking level when students are doing self-paced learning. I'll make my rounds in the classroom and talk to students about what they're learning and provide input as needed.

As for summative assessments, a rubric similar to below will be used for each standard being assessed. This is the same rubric that will be used throughout the school year, as students will be graded via “Standards Based Grading”. This will require them to show me that they have an in depth understanding of what they are learning about in class.

Proficiency Rating	Points
Exceeds Expectations	4
Meets Expectations	3
Approaches Expectations	2
Does Not Meet Expectations	1
No Attempt	0
Mastery at: 3 points	

- **Recommendations for implementation:**

One safety tip I would recommend for other educators is to put “FOR EDUCATIONAL PURPOSES ONLY” on all the handouts, notes, Canvas assignment, etc. Additionally, when students are collecting their water samples remind them to be safe when collecting their samples and *please* use common sense when it comes to whether or not they should collect their sample in a certain area.

SECTION 4: DRAFT MODULE LESSON PLANS – REQUIRED; OTHER DOCS/HANDOUTS - OPTIONAL

- **REQUIRED:** [Draft Lesson Plan Link](#)
- Handouts at this time are not currently ready as students are going to help create the handout when they provide input on their lead questions that they have.