**Project Title: Lab Math**

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**Keywords:** *calculations, solutions, dilutions, phage titers, metric, conversion, scientific notation, serial dilutions, lab math*

**Description:** *Explanations and demonstrations on how to use mathematical equations for various laboratory purposes, including those specific to SEA-PHAGES (such as plaque titers) and those that are used universally in most scientific settings. Practice problems are included, as well as questions for assessment development.*

**Learning objectives:**

After completing this module, students should be able to:

* *Demonstrate proper use of scientific notation and metric conversion in basic laboratory math problems.*
* *Identify and use equations to calculate the amounts of materials needed to make solutions and dilutions.*
* *Use dilutions and equations to calculate phage titers/plaque-forming units (pfu) per mL.*

**How is the module structured to promote student development as a scientist? *Self-efficacy****- This module will build student’s confidence in completing universal basic laboratory math calculations that can be applied to SEA-PHAGES and other science courses.*

***Science identity****- Once students can understand and complete the required laboratory math, they are more likely to self-identify as being able to do the work of a scientist.*

***Scientific community values****- Understanding the laboratory math modules will allow students to apply and appreciate the translational nature of math across scientific disciplines.*

**Intended Teaching Setting**

**Course level:** *any level of undergraduate student who has completed a basic mathematics course*

**Instructional Setting:** *in-person classroom or online*

**Implementation Time Frame:** *estimated up to one hour per module (4 modules total)*

**Acknowledgments:** *Original creator of the SEA-PHAGES math packet, Denise Monti (SEA-PHAGES forums* [*https://seaphages.org/forums/topic/4387/*](https://seaphages.org/forums/topic/4387/) *07/21/17)*

*Additional acknowledgements are listed in the individual documents.*

**Project Documents**

**Facilitator document:** Lab Math Instructor Guide

**Learning activity document(s):**

1 Student Guide Lab Math Basics

2 Student Guide Solutions

3 Student Guide Serial Dilutions

4 Student Guide Phage Titer Calculations

1 Additional Resources Lab Math Basics

2 Additional Resources Solutions

3 Additional Resources Serial Dilutions

4 Additional Resources Phage Titer Calculations

**Assessment document(s):**

1 Student Guide Lab Math Basics

2 Student Guide Solutions

3 Student Guide Serial Dilutions

4 Student Guide Phage Titer Calculations

1 Question Bank Lab Math Basics

2 Question Bank Solutions

3 Question Bank Serial Dilutions

4 Question Bank Phage Titer Calculations