

## How Many Molecules of Water Are There in Lake Erie?

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### Introduction

Lake Erie, located on the U.S.-Canadian border between Pennsylvania and Ontario, is one of the smaller Great Lakes. Even so, it contains a fair amount of water. How *much* water? Well, we're going to try to find out.

### Objectives

By doing this lab, students will be able to:

- conduct scientific investigations logically and systematically
- solve for unknowns by manipulating variables

### Materials and Equipment

Water	Eyedropper or Beral <sup>®</sup> pipet	Beaker
Graduated cylinder	Metric balance (analytical or top-loader)	

### Safety Considerations

- There are no special safety considerations for this lab.

### Procedure

Using the equipment listed above and the following information, determine the number of water molecules in Lake Erie.

- One mole of anything contains  $6.02 \times 10^{23}$  units.
- One mole of water has a mass of 18.02 grams.
- Lake Erie has an average depth of 18 meters.
- Lake Erie has an area of  $2.6 \times 10^4$  km<sup>2</sup>.

This might not be *all* the information you need. You might need some information (numbers, perhaps?) you get from using the equipment. Make sure you use the factor-label method (a.k.a. “dimensional analysis”) in all your calculations. Units are *definitely* important here!

### Questions

1. How many drops of water are there in 2 L of water?
2. How many drops of water are there in Lake Erie?
3. How many molecules of water are there in Lake Erie?
4. The recommended daily allowance of water is about 2 L. How many molecules of water should you drink each day?