How many molecules are in a single drop of water?

Name _____ Date _____

MATERIALS

You supply everything. Tick each item as you gather it.

- ☐ A medicine dropper or a pipette
- ☐ A measuring spoon or oral syringe that holds exactly 5 mL (a teaspoon is 4.9 mL, which is close enough if you use the same one each time)
- ☐ A small cup of water
- ☐ A calculator and paper

SAFETY

Use only water. Wipe up spills. No other safety concerns.

PROCEDURE

1. Fill the dropper with water. Hold it over the empty measuring spoon, and add drops one at a time, counting each, until the spoon is exactly full to its 5 mL mark.
2. Record the number of drops that filled 5.0 mL. Empty the spoon and repeat for 3 trials.
3. Compute the mean number of drops in 5.0 mL.
4. Use the density of water, 1.00 g/mL, to find the mass of the 5.0 mL, and divide by the mean number of drops to find the mass of one drop.
5. Convert the mass of one drop to moles using the molar mass of water, 18.02 g/mol.
6. Convert moles to molecules with Avogadro's number, 6.022×10^{23} molecules per mole, and then to atoms (each H_2O has 3 atoms).

RECORD YOUR DATA

Trial	Drops in 5.0 mL
1	
2	
3	
Mean	

Also write the mass of one drop, the moles in one drop, the molecules in one drop and the atoms in one drop.

LAB REPORT

Write a report that gives your drop counts, shows the full chain of conversions with units, and states how many molecules and atoms are in one drop. Compare your answer with a number a person can grasp, and say which measurement limits how many significant figures you can claim.

Report the numbers you actually got, even when they disagree with the lesson. Write on the lines, or type your report on the website and send it to a teacher there.

Question and hypothesis *State the question in your own words, what you expect to happen, and why you expect it.*

Method *What you changed, what you measured, what you kept the same, and how many trials you ran.*

Observations *Describe what you saw, including anything unexpected. Your data tables are added to the report automatically.*

Calculations *Show each calculation step by step, with units.*

Claim and reasoning *Answer the question using your numbers, then explain why, using the science from the unit.*

Limits and next step *What could have affected your results, and one change you would make next time.*