

## Molecules of Water: Counting by Weighing

### INQUIRY

How can we determine numbers of items in a very large sample?

### MATERIALS

- Water
- Electronic balance
- 3-oz cup
- Thin stem pipet

### BACKGROUND

- It would be impossible to individually count the number of atoms in any sample that is big enough to see. We use a word like 'dozen' to represent a certain number of items (12 items). We use another term, the mole, to represent a certain number of the particles that make up all matter.
- One dozen of anything = 12
- One mole of anything =  $6.02 \times 10^{23}$

### PROCEDURE

1. Turn on the balance and place a paper cup on it. Tare (zero) the balance so that it reads 0.00 g
2. Add one drop of water to the cup and find the mass of the drop. Record the mass in Table 1.
3. Use the same method to find the mass of 10 drops of water. Record the mass in Table 1.
4. Tare the balance with just the cup on it and then fill the cup to the top with water. If any water spills onto the balance, be sure and quickly clean it off the balance.
5. Find the mass of just the water in the cup and record the mass in Table 1. (Don't forget to tare the balance so that you have just the mass of the water.)
6. Dispose of the cup in the trash in the back of the room.

**Table 1 – Mass Data**

Item	Mass
Mass of one water drop	
Mass of ten water drops	
Average mass of one water drop	
Mass of water in cup	

### Putting it All Together (Calculations)

1. Use the mass of ten drops of water to make a conversion factor. Don't reduce it. Just use the data you have from your observations and write the conversion factor below.

