

## Do You Catch Your Clippings? Application

### Problem:

Can you determine the mass of a single paper clip without directly massing it?

### Materials:

box of uniform jumbo paper clips  
decigram or centigram balance  
beaker

### Procedure:

The purpose of this experiment is to simulate the experiment Millikan used to determine the charge of one electron. You are being asked to modify his procedures to determine the mass of just one paper clip without directly measuring it.

The following ground rules must be followed:

1. Masses may only be taken of the container holding an unknown number of paper clips.
2. You are to either remove or add bunches of clips before each massing. Never add or remove less than five clips.
3. As you remove or replace clips, the total mass of the remaining clips is to be recorded. The number of clips removed and the number of clips remaining MAY NOT be determined by counting. At least 25 mass measurements are recommended.
4. Form a group plan to use your data to calculate the mass of one paper clip.

### Summing Up:

1. Explain why your answer represents the mass of only one clip.
2. How would additional massings affect the outcome?
3. How would you explain any observed discrepancies in your data?