

## Lab 18 – Air Resistance

- You need TWO hypotheses, one for part 1 and the other for part 2. (Omit #3.)
- Your variables are NOT in the TO, but instead you will have to figure them out when you read through the lab while setting up the notebook. This is your “draft” copy.
- Pay attention to what you are trying to HOLD CONSTANT in each situation to help you determine the independent and dependent variables. Think of the 2<sup>nd</sup> Law to help frame your thoughts.
- USE YOUR RUBRIC from lab 13 to help you make the best vector diagrams possible.
- A final/polished copy of this lab is due on Wednesday on LOOSE-LEAF. No, I will not grade it early. Look through all of your resources and discuss with your partners, but YOU must create and be willing to stand by your two vector diagrams.



**AIR RESISTANCE** You do NOT have to stand in a chair for #1, but DO try for decent height for #2. **Motion 18**

1. Divide a sheet of scratch paper exactly in half. Crumple one, leave the other flat.

2. Crumple the flat sheet around 10 pennies until it is the same size as the other.

*Illustration 1: A person holding a flat sheet of paper and a crumpled sheet. A speech bubble says "DROP TOGETHER." A dashed arrow points down from the flat sheet. A text box says "use vector diagrams!"*

*Illustration 2: A person holding a crumpled sheet with 10 pennies inside and a flat sheet. A speech bubble says "DROP TOGETHER." A dashed arrow points down from the crumpled sheet. A text box says "10 PENNIES INSIDE".*

a. Compare their rate of free-fall.  
b. What is the real cause of objects not falling together? Draw a labeled diagram to show the forces acting on each paper.

a. Now that they have the same air resistance, do they free-fall together?  
b. What role does mass play in overcoming air resistance? Explain.

~~3. Put a penny and a wisp of cotton (or a feather) in a paper cup.  
a. Predict what will happen when you drop the cup. b. Test your prediction. the cup. Refer to Newton's second law.~~

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