Another FREE SAMPLE LAB from TOPS LEARNING SYSTEMS!

This **TOPS Idea** is taken from an original series of black-and-white line masters, adapted to stand alone as an independent mini-lesson. Please purchase our original book to get the whole in-depth program.

letter weights

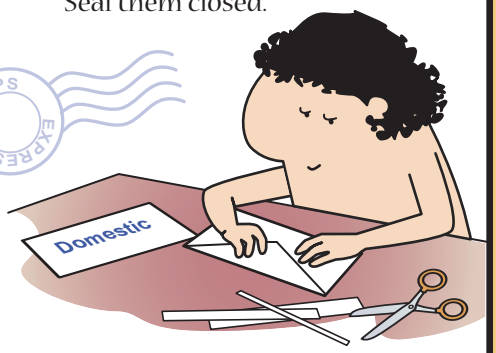
…adapted from **WEIGHING #05** by TOPS Learning Systems

1. Label two envelopes like this:

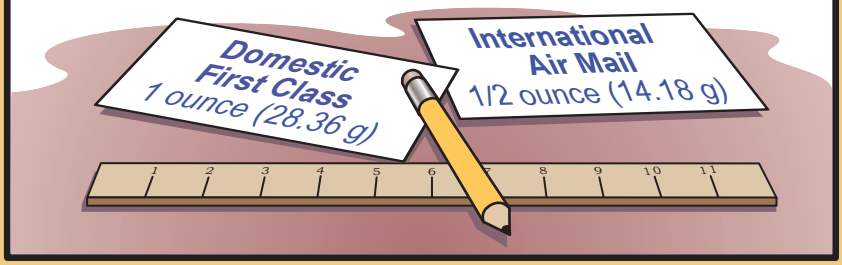
Domestic
First Class
1 ounce (28.36 g)

International
Air Mail
1/2 ounce (14.18 g)

2. Fill them with just enough paper to equal each weight limit. Seal them closed.



3. Given only these envelopes plus a pencil, ruler, and perhaps a pinch of clay, invent a simple method that allows you to estimate postage any time you want to mail a letter.



OBJECTIVE

To devise a simple method for estimating postage rates using an equal arm lever. To develop a kinesthetic feel for one ounce.

LAB NOTES

Photocopy the lab above for each student or lab team. Black and white copies are fine.

Step 2. Roughly 3 sheets of paper plus envelope weigh 1/2 ounce; 7 sheets plus envelope weigh 1 ounce. Cut paper as needed to make precise weight standards.

Step 3. Let students grapple with this problem before helping. *Hint:* mention see-saw experiences.

MATERIALS

- An ounce scale or gram balance. *(In the TOPS book WEIGHING #05, students improvise gram balances that serve well here.)*
- Envelopes, legal or personal size.
- Notebook or scratch paper, and scissors.
- Domestic/international postal rates *(optional)*.
- A rigid 12-inch ruler, or similar metric ruler.
- A pencil *(fulcrum)* and pinch of clay *(rider)*.

ANSWERS

3. ***(a)*** Put a pencil fulcrum under the center division mark of a ruler. ***(b)*** Add a clay rider, if needed, to make the ruler balance level. ***(c)*** Place either "letter weight" opposite a letter of unknown weight, keeping both envelopes equidistant from the center. ***(d)*** Notice how the unknown goes up (lighter) or down (heavier) relative to your letter-weight standard.

EVALUATION

Q. How would you use a 'two-by-six' board and a brick to determine the lightest person in class?

A. ***(a)*** Mark the center of the board and rest it on the brick. ***(b)*** If it won't balance level, rest a stone rider on the higher side to compensate. ***(c)*** Compare the weight of students, two at a time, by standing them at equal distances from the brick. ***(d)*** A lighter student will be lifted by a heavier student. *(Use spotters if you try this.)*

EXTENSION

Extend the capacity of your balance to 3 ounces. *Stuff 2 more envelopes to weigh one ounce each.*

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