

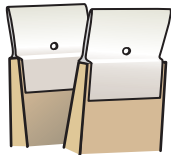
## Another FREE SAMPLE LAB from TOPS LEARNING SYSTEMS!

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.

### paper beam balance

...adapted by TOPS Learning Systems  
from PERFECT BALANCE #31

**1.** Make tape "ears" on the ends of a clothespin. Wiggle large pinholes in the middle of each.



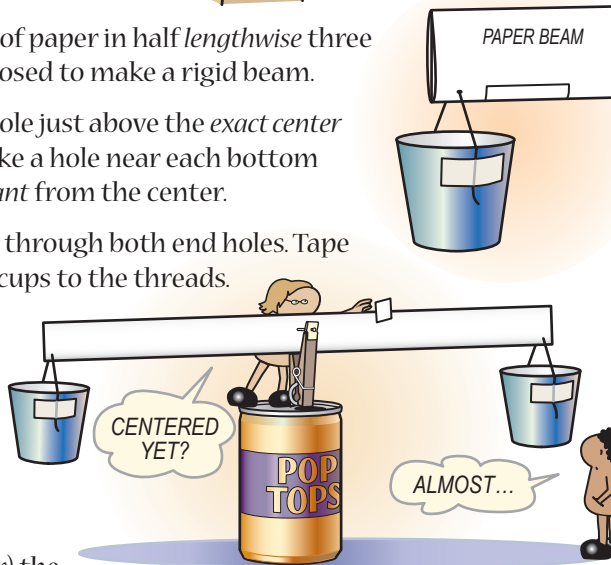
**2.** Clamp upright to the raised pull-tab on a soda can.

**3.** Fold a sheet of paper in half lengthwise three times. Tape it closed to make a rigid beam.

**4.** Make a pinhole just above the exact center of the beam. Poke a hole near each bottom corner, equidistant from the center.

**5.** Push thread through both end holes. Tape small drinking cups to the threads.

**6.** Center the beam between the "ears" and run a pin through the three pinholes.



**7.** Level (center) the beam with a bit of tape stuck lightly on the lighter (higher) side.

**8.** Weigh a penny (and other stuff) in paper clip units!

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#### OBJECTIVE

To construct a paper balance, to use it to compare masses of small objects.

#### LAB NOTES

Make a photocopy of the activity above for each student or lab team.

**Step 3.** Match corners and edges carefully; crease well. Tape closed at the center and near each end.

**Step 4.** Accuracy is critical. Careful students might help others measure. To punch pinholes, place the beam on a yielding surface, such as styrofoam or cork.

**Step 5.** A sewing needle helps. Or precut 8-inch (20 cm) lengths of thread and barely moisten one end with white glue. This will quickly dry into a "needle."

#### MATERIALS

- Tape (clear or masking).
- Ruler.
- Recycled soda can with pull-tab still attached.
- Scissors.
- Straight pin.
- Paper clips, same size and brand.
- Spring-action clothespin.
- Thread (and optional needle or glue).
- Objects to weigh: washers, corks, buttons, marbles, coins, beans...
- Sheet of recycled copy paper (fold print side in).
- 2 small paper cups.

#### ANSWERS

8. U.S. pennies weigh 4-6 paper clips (depending on brand of clip). Pennies minted before 1982 are heavier.

#### EVALUATION

A centered balance should remain level when 10 paper clips are added to each side. If the balance is biased, the longer arm will always tilt downward, even if weights are switched.

#### EXTENSION

Cut a uniform strip of paper to weigh precisely 1 paper clip. Cut it into these fractional pieces to weigh objects to the nearest tenth of a clip (pc): 0.5 pc, 0.2 pc, 0.2 pc, 0.1 pc.

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