

Lock Washers & Batteries Activities (Page 1)

Engagement Activity:

Demonstrate to the students **how to put together** the milk carton balancing apparatus. Make sure the students know that if the milk carton apparatus **does not balance** after assembled then they are to **check with the instructor** before proceeding.

Explain the activities for today are to try and balance the milk carton apparatus using **lock washers on one side** and **a single used battery on the other side**. This appears to be very simple however the students do not know, at this time, there is only enough lock washers to balance the smallest battery. **When they ask for more lock washers, they must do with the (30).**

Make sure to explain to the students there is a **critical need** to **carefully record** their results or the number of lock washers needed to balance each of the used batteries (D, C, 9V, and AA).

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Exploration & Explanation Activity:

It might be a **good idea** to suggest to the students that starting with the AA battery (known as the baby battery) would be best? Or, it might be a good idea to say nothing and let them decide?

In any case it won't take long before they find out there is a need for more lock washers and they cannot have more than the given. Hopefully they can determine how to use **only** the given materials and successfully conclude how many lock washers is needed to balance each of the various size used batteries (D, C, 9V, AA). Allow them ample time to wrestle with this wonderful dilemma and control your urge to tell them how to determine the solution.

Be sure they how they determine the solution. Have them re-check their results and carefully record the lock washers per battery.

_____ To be checked off by instructor.

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Elaboration Activity:

The initial group of lock washers and batteries will serve as the **known** set of units which will be used to determine the number needed to balance a group of **unknown** objects.

During this activity the students should be given a group of **unknowns** such as: small block of wood, large block of wood, tablespoon, pulley, toy car, and whatever else is available.

They should precede **applying** knowledge gained from previous activity and known units (lock washers and used batteries) to determine the number of lock washers needed to balance the milk carton apparatus when unknown objects are used.

Again students should be asked to explain how they determine the number of lock washers for each **unknown object** and they should **record results** for later comparison with other teams.

_____ To be checked off by instructor.

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Evaluation Activity:

During this final activity, the students should re-visit and/or reflect on the previous activities of exploration & elaboration. as a team and discuss each previous activity in detail.

The instructor should construct a compiled summary of the individual team results of the known units (D, C, 9V, AA) and the unknown units using an overhead or chalkboard.

The class as a whole under the instructor's guidance should discuss reasons for discrepancies in known and unknown units.

As well as, problems caused by the apparatus and/or the process used by each team to determine the known and unknown units.

What have we learned from these Lock washer & Batteries activities?