

Lever Lab

Name _____ Date _____ Group _____ Period _____

Could you lift up a car all by yourself? One way is with a **lever**.

The lever is an example of a simple machine.

This experiment will explore the concepts of force and balance as they apply to a lever.

You will be arranging various numbers of identical weights on a lever with the goal of getting the lever to balance. The number of weights on opposite sides of the lever must be different for all of your set ups!



Objectives:

1-To make a balanced lever (of the type seen below) when the number of weights on opposite sides of the lever must be different.

2- To uncover the mathematic rule that describes a balanced lever.

Variables: By the time you finish this experiment ,you will need to identify the different types of variables present in this investigation. Consult your notes for definitions of the types of variables.

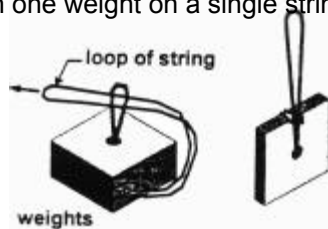
Independent Variables: The number of weights on opposite sides of the lever and...

Dependent Variables: A balanced lever that does not rotate

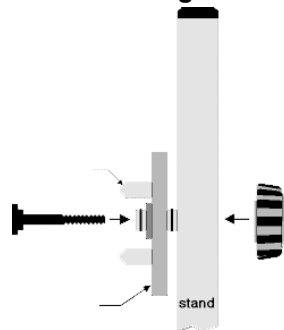
Controlled Variables: Same kind of weights,fulcrum always in center of lever,length of lever

Hanging weights

Use loops of string to make hangers for the weights. You can put more than one weight on a single string.

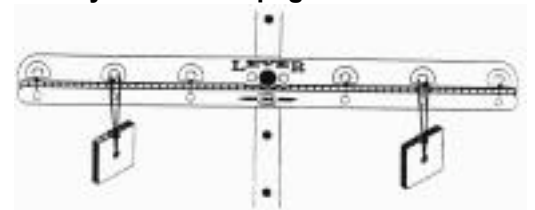


Attaching the Lever



Attaching the weight

The weights can be hung from the Lever by hooking the string over the center peg in the holes. **Make sure that the string is all the way around the peg!**

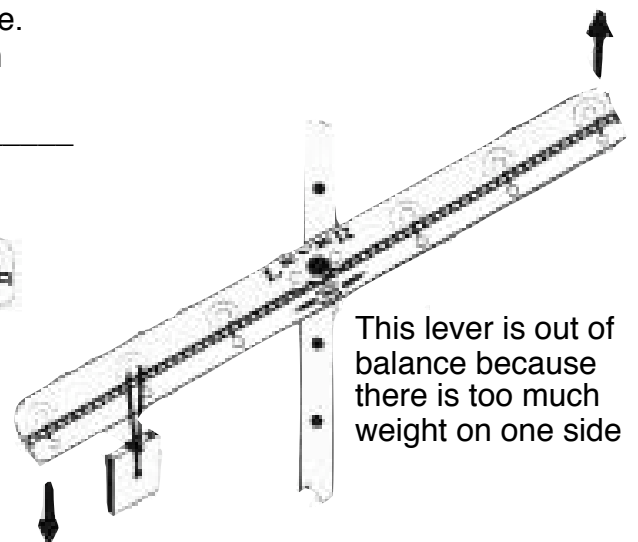
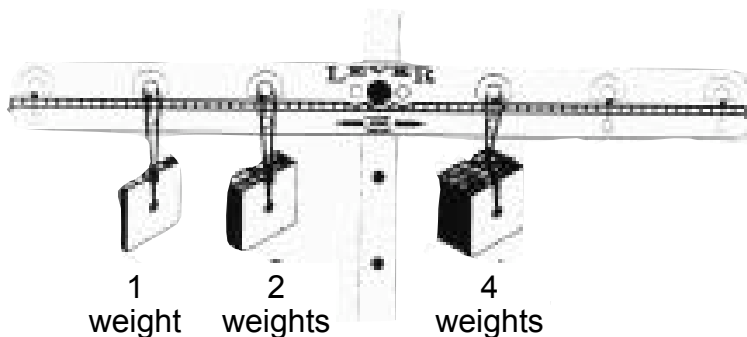


Balance

The lever is in balance when all the weights on one side are able to balance all of the weights on the other side.

Hang the weights as shown below, on your lever, then answer the question.

Question 1 Does the lever below balance? _____



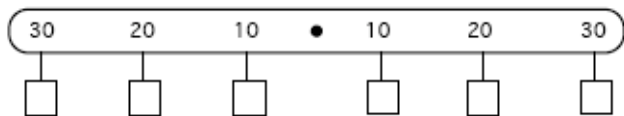
This lever is out of balance because there is too much weight on one side

Procedures

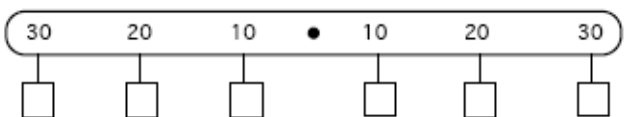
- Make 6 different combinations of weights and positions that balance. Put the number of weights used at each position in the boxes below the 30, 20, and 10 positions on the lever.
- Use the charts below to write down the numbers of weights you put in each position.

Make sure that:

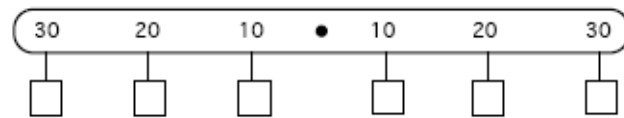
- Your setups are **not simply mirror images** of previous setups.
- The **right side** of the lever is **different** from the **left side** of the lever.



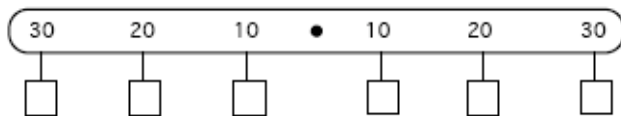
Trial # 1



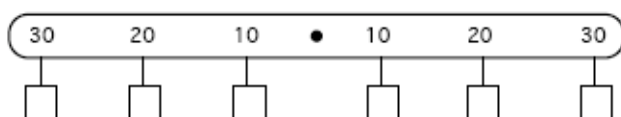
Trial # 2



Trial # 3



Trial # 4



Trial # 5



Trial # 6

Question 2

- Come up with a simple rule that describes a lever that balances.
- Your rule must take into account the number of weights and where the weights are located.
- Look at the number of weights and where the weights are located on the **left** side of the lever and compare it to the number of weights and where the weights are located on the **right** side of the lever.
- **Write down your rule in the form of an equation with an equal sign.**
- Imagine that the fulcrum in the center of the lever represents the equal sign.
- As a check, see if the rule will work for the balanced levers in the trials you did. Use the space below for your rule.
- **DO NOT GIVE AN EXAMPLE.**

Sources of Error :Identify **two** things that people may have done incorrectly that would have caused them to get totally different answers from the rest of the class. These errors must be unique, in other words they have not been applicable in previous labs. They must be **new** sources of error. Be **specific** about what might have been done.
