

State the principle of
triple beam balance



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State the principle of triple beam balance A beam balance measures mass as opposed to weight, so the mass you weigh will be the same on the moon as it is on earth. Gravity is taken out of the equation, unlike a spring balance that measures weight and would measure an article to be 1/6 of the weight on the moon as it would be on earth using the same spring balance that relied on gravity. The principle is that of moment, or turning force/torque), calculated by force x distance. Fundamentally, in the case of a balance beam, the force is gravity acting on each side of the fulcrum of the balance, and distance is the distance from that fulcrum. Since gravity will be constant wherever you are, only moment or torque will be relevant. A spring balance is not a comparison technique, so gravity changes will be relevant to the result - hence only weight can be measured. Basically, if the two forces each side of the balance point (fulcrum) are equal, the balance will be horizontal. The pointer on the balance indicates this condition. The sample being weighed has a specific mass generating a fixed moment at its fixed position. The moment exerted by the mass on the other side of the fulcrum can be varied according to the position of the sliding weights on the beam, or lever. These positions have been calibrated to correspond to specific relative masses (popularly known as weights), so when each side is balanced you can read the weight that is balanced against the sample. To be completely scientific, we are measuring torque when we use a balance beam, and moment and torque each side will be equivalent when the beam is balanced. Torque is a function of arm length and applied force. However, the point is that a balance beam measures true mass, and not just weight that changes with changing gravitational force. A beam balance measures mass as opposed to weight, so the mass you weigh will be the same on the moon as

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Sources of error in Weighing Scales 1) Mis-calibration Any type of weighing scale should go through routine calibration. The calibration of electronic circuits may drift as time <https://assignbuster.com/state-the-principle-of-triple-beam-balance/>

goes by. To avoid errors due to mis calibration, make sure you go to authorized centers and calibrate your instrument regularly.

- 2) Vibration and seismic disturbances; for example, Wind, Fans, or passing of heavy trucks.
- 3) Mis-aligned mechanical components. This happens due to thermal expansion (expansion due to heat) or contraction of mechanical components of the balance.
- 4) Magnetic field errors happens due to fields of nearby electric wiring and also from earth's magnetic field.
- 5) Friction of the mechanical components that prevents scale to reach equilibrium.
- 6) Corrosion of mechanical components may produce errors
- 7) Chemical reaction between air and substance being measured, happens with highly reactive substances that needs to be weighted.
- 8) When measuring wet items, error may occur due to evaporation of water or for cold items due to condensation.
- 9) Coriolis force exerted from Earth's rotation although this is systematic error.
- 10) Gravitational irregularities i. e. using the balance near a mountain; failing to level and recalibrate the balance after moving it from one geographical location to another [http://www. articlesalley. com/article. detail. php/90811/1/Sales/Business/1/Sources_of_error_in_Weighing_Scales](http://www.articlesalley.com/article-detail.php/90811/1/Sales/Business/1/Sources_of_error_in_Weighing_Scales)

RULES FOR WEIGHING:

1. Do not handle objects to be weighed with bare hands. Use tongs, or paper towels if no appropriate tongs are available.
2. Never weigh chemicals directly on the balance pan; use a glass container or weighing paper or filter paper.
3. If you spill a chemical on the top -loading balance, clean it immediately. Never spill chemicals inside the analytical balance enclosure. Keep the weighing chamber and weighing pan clean.
4. Before using the balance, be sure that the pan is clean. If it is dirty report it to your instructor, then brush it off with the brush provided.
5. Do not overload the balance. The maximum capacity of the top -loading balance is <https://assignbuster.com/state-the-principle-of-triple-beam-balance/>

620 g. The maximum capacity for the analytical balance is 110 g. 6. Do not weigh hot or cold objects on the balance. Hot objects will give erroneously low readings due to buoyancy of hot air, while cold objects will give high readings. 7. Check to be sure that the balance is level. It is level if the bubble in the Level Indicator is in the center while the balance is " OFF". Your instructor may need to adjust the Leveling Feet. <http://www.ccchemistry.us/ch%20111%20experiment%203.pdf> Why do different metals have different characteristic flame test color? Each metal has a different emission spectrum because each metal has a different configuration of electrons. Since electrons can only emit specific amounts of energy and $E = h\nu$, where $E =$ energy $h =$ Planck's constant and $\nu =$ vibrations per second, and E stays the same and h stays the same, the vibrations differ. Different vibrations mean different spots on the electromagnetic spectrum, and so there are different colors. http://wiki.answers.com/Q/Why_do_different_metals_have_different_characteristic_flame_test_color Most salts contain a metal and a nonmetal look at the compounds Since each (halide) salt contains chlorine, in this example, but different colors were observed, the differences in colors must be attributed to the (different) metals, and not to the non-metal (chlorine) which is the same in every case. <http://answers.yahoo.com/question/index?qid=20101016085911AA2cjfY> What color did you unknow produce in the flame and What is your unknow? You are referring here to the " flame test" to identify an unknown substance by the color it produces in a flame. The test is more usefull in determining what the sample does notcontain, rather than what it does contain, since many substances will produce similar colors in a flame test. Manganese, for instance, will produce yellow-green, but so will <https://assignbuster.com/state-the-principle-of-triple-beam-balance/>

molybdenum. Sodium will produce a bright yellow color which you have seen in sodium vapour lamps that are used along highways. Iron produces a gold color, and copper, a blue-green. There are many others. http://wiki.answers.com/Q/What_color_did_you_unknow_produce_in_the_flame_and_What_is_your_unknow Why do the chemicals have to be heated in the flame before the colored light is emitted? Every chemical element on the periodic table has its own spectral fingerprint that identifies it when it is in a gaseous form. -

Electrons around the nucleus of the metal atoms in these chemicals must be moved to a higher energy state by the heat energy in the flame. And when they fall back to their original position called the "ground state" they give back that absorbed energy in the form of visible light. The light is created by the transfer of energy to and away from atoms. <http://answers.yahoo.com/question/index?qid=20091213172359AAQnVfA> Could flame tests be

useful in determining densities of metals in a mixture of two or more salts?

Flame tests can be used to determine the identities of metals in a mixture of 2 or more salts. This is however not very much because compounds of metals and salts have different colors than regularly. It would also be hard to tell the colors apart. <http://www.ask.com/answers/132264201/could-flame-tests-be-useful-in-determining-densities-of-metals-in-a-mixture-of-two-or-more-salts>

The flame test will work fine. It is simply a method of determining the element by the color it emits when burned. However, as the first answerer mentioned it will be difficult to determine the exact wavelengths that you are dealing with. Which method is better for precisely identifying elements:?