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ShareAlike If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original. No additional restrictions You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits. You do not have to comply with the license for elements of the material in the public domain or where your use is permitted by an applicable exception or limitation . No warranties are given. The license may not give you all of the permissions necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material. Greek mathematician, physicist, and engineer Archimedes of Syracuse suggested in his 250 BCE work On Floating Bodies, that any object, whether totally or partially immersed in a fluid, is buoyed up by a force equal to the weight of the fluid displaced by the object.The infamous assertion made by the ancient Greek polymath is now known as the Archimedes Principle or the physical law of buoyancy. It essentially explains why certain objects float in a fluid and more specifically, why massive objects such as ships float despite their weight.Buoyancy and Buoyant Force: On Floating BodiesBasics of Archimedes Principle: Explaining BuoyancyRemember that the Archimedes Principle explains buoyancy or more specifically, the upward force exerted by a fluid called buoyant force. The principle states that the buoyant force acting on a submerged object is equal to the weight of the liquid displaced by the object.It can be summed up as follows: An object sinks if the weight of the water it displaces is less than the weight of that particular object. On the other hand, that object will neither sink nor rise if its weight is equal to the weight of the water it displaces.Ships are notable examples. When launched into a body of water, a specific ship would naturally sink until the weight of the water it displaces becomes equal to its own weight. However, as the ship is loaded, it sinks further and displaces more water. The magnitude of the buoyant force continuously matches the weight of the ship.Take note that the principle also explains that an object will rise if its weight is less that of the displaced fluid. Examples of this phenomenon include paper boats, a block of wood, and plastics placed on a body of water.Shortcomings: Limitations of the Archimedes PrincipleOne of the major problems or limitations of the Archimedes Principle is that it does not take into consideration other factors that can affect the dynamics between an object and fluid. Consider surface tension as an example.Surface tension refers to the tendency of fluid surfaces to shrink into the minimum surface area possible. It is essentially an attractive force exerted upon by liquid molecules on the surface by other liquid molecules beneath. The phenomenon allows certain insects to float and slide on a water surface.The principle also breaks down in certain conditions, especially in complex fluids. These complexities are present in both natural and deliberate settings. For example, in industrial applications, heavy salts or colloidal nanoparticles are added to fluids to create a density gradient in the solvent needed to separate the various components in suspension.FURTHER READINGS AND REFERENCESMohazzab, P. 2017. Archimedes Principle Revisited. Journal of Applied Mathematics and Physics. 5(4): 836-843. DOI: 10.4236/jamp.2017.54073Wilson, R. M. 2019. Archimedes Principle Gets Updates. Physics Today. 65(9): 15-17. DOI: 10.1063/PT.3.1701 0 ratings0% found this document useful (0 votes)2K viewsThis lab report summarizes an experiment investigating Archimedes' principle and buoyancy through three parts. In the first part, students measured the density of wooden blocks by submergingSaveSave Archimedes Principle Lab Write Up For Later0%0% found this document useful, undefined100%(2)100% found this document useful (2 votes)3K viewsThis document summarizes an experiment on Archimedes' Principle. The experiment used three methods to measure the buoyant force on objects submerged in water: weighing objects in air and watSaveSave Lab Report (Archimedes's Principle) For Later100%100% found this document useful, undefinedLab Partners: Max McCandless and Vincent MeleDate of Completion: May 30th The purpose of this lab is to investigate Archimedes' Principle. Archimedes' Principle states that the buoyant force of an object is equal to the weight of the water that the object displaces. In addition to this, apparent weight, or the weight an object seems to have when submerged in a fluid, is equal to the actual weight minus the buoyant force.Note: in the second equation shown below, the density of the fluid times the volume that the object displaces is substituted in the place of the mass of the displaced fluid. substitute this for the volume in the first equation Take the mass of the object Take the apparent mass of the object Take the mass and volume of the fluid 1. Derive an equation that can be used to solve for the density of a fluid using information gained from putting an object in it. (See: Theory)2. Mass the object in the air.3. Tie a string through the object and set the balance to use the hook rather than the surface.4. Put one of the four fluids in a beaker, put the beaker on the balance, and hang the object on the hook in a fashion so that it is submerged in the fluid but does not touch any of the sides of the beaker.5. Record the apparent mass.6. Repeat this process with two more of the fluids.7. Adjust the balance so it works with the surface rather than the hook once more.8. Zero the balance with a beaker on it.9. Pour some of one fluid in the beaker, and record the mass and volume the fluid takes up.10. Repeat with the other two liquids used previously.11. Find the volume of the object by dropping it in the fluid and seeing how much the volume changes (only do this once)12. Calculate density, and compare the results to those found using the first method. Note: The densities are blank because they must be calculated method 1 method 2 In this lab, Archimedes' Principle was investigated. Using the idea that the buoyant force of an object is equal to the weight of the fluid displaced by the object, the density of the fluid the object is submerged in can be calculated. This information is confirmed when this calculated density is compared to the density calculated by simply taking the mass of the fluid divided by the volume. These results yield a very low percent difference, and from this information it can be concluded that the values are nearly the same. This information confirms Archimedes' Principle, and its value in practical situations.Some possible sources of error are the measuring equipment, as some of the values are likely to be slightly inaccurate due to the fact that no piece of measuring equipment is perfectly accurate. Also, the weight of the string does have a slight effect on the apparent masses found when the object was submerged in the fluids. The string's mass is only nearly negligible. The Physics Classroom.com.Retrieved on May 30th, 2014, from

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