

Science Strand 6: Composition and Structure of the Universe and the Motion of Objects Within It.

CLE: 6.2 Regular and predictable motions of objects in the universe can be described and explained as the result of gravitational forces.

Health Profession: Laboratory Technologist

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Reference:

Rosen, L. *Intro to Drug Screening*. Retrieved January 30, 2008, from <http://www.employmentdrugtesting.com/screening.html>

Objectives:

At the completion of this presentation the high school student will be able to:

- 1. State five reasons that the position of laboratory technologist is important to everyday practices.**
- 2. Show how water weighs less than some liquids and more than others.**
- 3. Identify the importance of this information to everyday life.**

Background Summary of Information as Related to Laboratory Technologists and CLE:

When the laboratory technologist receives a specimen they note color and odor. They then run a specific gravity test. Specific gravity is the relative density of that liquid compared to water. Normal ranges for specific gravity of urine are between 1.002 and 1.028. If the specific gravity test is low this can indicate excessive hydration. To confirm the excessive hydration they then can check the creatinine levels. If the creatinine levels comeback low then this is indicative of water loading. Water loading is when an excessive amount of water is consumed in order to dilute a urine specimen. The urine specimen is then void and another specimen must be attained. This usually will be a saliva, hair, or blood sample. These samples can detect drug use for a longer period than can a urine sample. These methods of sampling are very accurate.

Scenario:

Jeremy is a sixteen year old sophomore at River Falls High School. His mother wants him to get a job to pay for his car, car insurance, and gas. He applies at several different places including McDonald's, Dillard's, and Quick Trip. The first place that calls him for an interview is McDonald's. He goes to the interview and thinks that he would really like this job. He likes talking and meeting new people. At the end of the interview the manager offers Jeremy a job. He excitedly accepts. The manager then hands him a card and a paper with a map on it. He tells Jeremy that he must go to this place by 5 PM for a drug test in order to get the job. At the time it is 3 PM. Jeremy takes the card and map and thanks him. When Jeremy gets outside he starts to panic. At a party last Saturday night he smoked pot with all of his friends. He calls his friend Erica to tell her and ask her what to do. Erica tells him that she once saw a special on

a TV show that said if you drank a whole bunch of water then they can't detect the pot in your drug test. He goes to Wal-mart and gets a gallon of water. He chugs the gallon of water. He has to stop several times on the way to the place to use the restroom. He gets there and feels a lot better. He thinks that they surely couldn't detect the pot in all of this dilute urine. He gives the specimen to the nurse and she says to wait here she'll run it to lab real quick for the results. In the lab, the laboratory technician, Brenda, looks at the specimen. Brenda just graduated from KU with a Bachelor's in Chemistry (she makes a salary of \$40,000 a year). She notes that it is very clear and does not look much like urine. So she puts it in the specific gravity machine to see if there is anything in there that is heavier than water. It turns out it is all pretty much water. She then checks the creatinine level and it is low. She knows this is indicative of "water-loading". She calls the nurse and tells her this. The nurse then asks Jeremy to come to an exam room to draw blood. He starts to sweat. He asks why she needs a sample of blood. He tells her that his urine was too dilute to test for drug toxins so they would need a sample of his blood. He knew right then he was caught. She takes the sample and runs it to the lab again. This time the sample comes up positive for marijuana. The nurse thanks Jeremy and says that he can leave. She then calls the manager at McDonald's and informs him of the results. Jeremy ended up not getting the job.

Activities:

Take a two liter bottle. Pour colored water into the bottom of the two liter bottle until it is 1/3 full. Then add peanut oil until it is 2/3 full. Finally fill the rest of the bottle with gasoline. When the bottle sits for a minute the oil should be on the bottom, the water in the middle, and the gasoline on the top. This shows that the specific gravity of gasoline is less than water and oil; and that the specific gravity of oil is higher than that of water or gasoline.

1. What is specific gravity? The relative density of a liquid compared to water.
2. Which liquid has the highest specific gravity? Oil
3. Which liquid has the lowest specific gravity? Gasoline

Supplies Needed: 2 liter bottle, peanut oil, colored water, gasoline.

Laboratory Technologist

Education: A bachelor's degree with a major in medical technology or one of the life sciences. The course work usually includes chemistry, biological sciences, microbiology, mathematics, and statistics.

Locations: Anywhere that offers a four year medical technology degree or life sciences degree such as the University of Missouri Kansas City, the University of Kansas, Rockhurst, Kansas State, Pittsburg State, Emporia State, the University of Missouri, Missouri State, Central Missouri, St. Louis University, Westminster, William Jewell, Washington University, and Truman State University.

