



## % Sugar in Soda



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## Soft Drinks

Average American drinks 53 gallons a year

US annual volume ~ 9.4 billion cases of soft drinks

US annual sales ~ \$ 73.9 billion (27% world market)

Coca Cola claims world-wide consumption: 16,000 drinks / sec

Coca Cola world's second most recognized trademark



Carbonation from American beverages annually add  
800,000 tons of CO<sub>2</sub> to atmosphere

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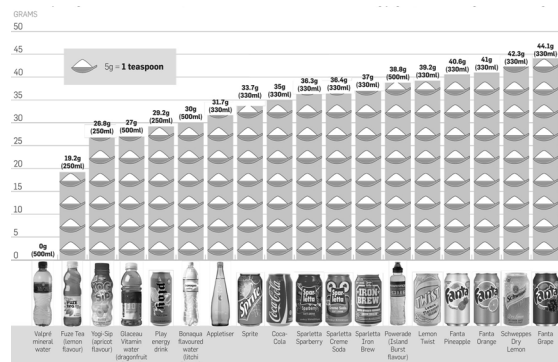
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## Sugar is Sweet



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### How Sweet Is It?



**48 % of sugar consumption comes from beverages**

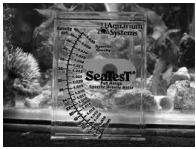


**Obesity rate among adults is highest in the United States**







### Density Depends On Concentration




**Aquarium Salinity**



**Radiator Protection**



**Sugar in Maple Syrup**



**Alcohol in Moonshine**

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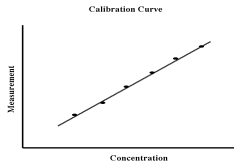
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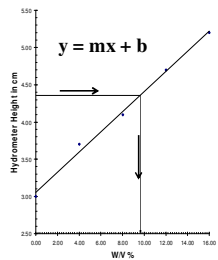
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### Calibration Curves

#### Plot Physical Property vs. Concentration



Calibration Curve



$y = mx + b$

**Plot is basis for analysis of unknowns**  
**Measure physical property**  
**Use substance to be analyzed**  
**Find corresponding concentration**

A Standard Curve is Common Technique of Chemical Analysis

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### Quality Control

**Important Commercial Process**

Too little sugar → beverage bitter  
 Too much sugar → expensive syrup

**Consequences of Analytical Error:**

Too low – manufacturing adds sugar to product  
 Too high – Manufacturing removes sugar from process

**Good quality control keeps everyone happy!**




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I Like Sugar!



Keep this customer happy  
Do a good analysis!



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**% Sugar in Soda Lab**

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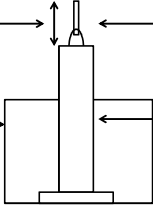
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**Eye Dropper As Hydrometer Lab**

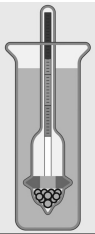
Handout describes procedures for:  
 Preparing solutions for analysis  
 Known concentrations  
 Measuring density (for each solution)

Measure this height



Beaker  
(To catch overflow)

Hydrometer



50 mL Graduate Cylinder  
(Completely filled)

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## Let's Boldly Go Explore Today's Lab



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