# Exploring Density

Student Name

Date

## Data

### **Activity 1**

Data Table 1

| **Cylinder Type** | **Mass (g)** | **Height (cm)** | **Diameter (cm)** | **Radius (cm)** | **Calculated Volume (cm3)** | **Density (g/cm3)** |
| --- | --- | --- | --- | --- | --- | --- |
| **Aluminum** |  |  |  |  |  |  |
| **Acrylic** |  |  |  |  |  |  |
| **Polyethylene** |  |  |  |  |  |  |

1. The accepted densities for the cylinders used in Activity 1 are shown in the table below. How do these numbers compare to the calculated values? What sources of error could cause the differences?

| **Substance** | **Density (g/cm3)** |
| --- | --- |
| Aluminum | **2.7** |
| Acrylic | **1.2** |
| Polyethylene | **0.9** |

## Activity 2

Data Table 2

| **Percentage of Sucrose in Solution** | **Volume****(mL)** | **Mass of Solution + Graduated Cylinder****(g)** | **Mass of Cylinder****(g)** | **Mass of Solution****(g)** |
| --- | --- | --- | --- | --- |
| 0% | 5 |  |  |  |
|  | 10 |  |  |  |
|  | 15 |  |  |  |
|  | 20 |  |  |  |
|  | 25 |  |  |  |
| 10% | 5 |  |  |  |
|  | 10 |  |  |  |
|  | 15 |  |  |  |
|  | 20 |  |  |  |
|  | 25 |  |  |  |
| 20% | 5 |  |  |  |
|  | 10 |  |  |  |
|  | 15 |  |  |  |
|  | 20 |  |  |  |
|  | 25 |  |  |  |
| 30% | 5 |  |  |  |
|  | 10 |  |  |  |
|  | 15 |  |  |  |
|  | 20 |  |  |  |
|  | 25 |  |  |  |
| 40% | 5 |  |  |  |
|  | 10 |  |  |  |
|  | 15 |  |  |  |
|  | 20 |  |  |  |
|  | 25 |  |  |  |
| 50% | 5 |  |  |  |
|  | 10 |  |  |  |
|  | 15 |  |  |  |
|  | 20 |  |  |  |
|  | 25 |  |  |  |
| 60% | 5 |  |  |  |
|  | 10 |  |  |  |
|  | 15 |  |  |  |
|  | 20 |  |  |  |
|  | 25 |  |  |  |

1. What happens to the density of a solution as the concentration of sucrose increases?

### Data Table 3

| **Percentage****of Sucrose in Solution** | **Equation of the Best Fit Line with y-intercept = 0** | **Density (slope) in g/cm3** |
| --- | --- | --- |
| 0% |  |  |
| 10% |  |  |
| 20% |  |  |
| 30% |  |  |
| 40% |  |  |
| 50% |  |  |
| 60% |  |  |

Insert graph from Data Table 3 here.

Data Table 4

| **Percentage of Sucrose Solution** | **Predictions: Aluminum Cylinder** | **Predictions: Acrylic Cylinder** | **Predictions: Polyethylene Cylinder** | **Observations: Aluminum Cylinder** | **Observations: Acrylic Cylinder** | **Observations: Polyethylene Cylinder** |
| --- | --- | --- | --- | --- | --- | --- |
| 0% |  |  |  |  |  |  |
| 10% |  |  |  |  |  |  |
| 20% |  |  |  |  |  |  |
| 30% |  |  |  |  |  |  |
| 40% |  |  |  |  |  |  |
| 50% |  |  |  |  |  |  |
| 60% |  |  |  |  |  |  |

Activity 4

Insert graph from Data Table 2 here, as directed in Activity 4, step 1.

Data Table 5

| **Volume (mL)** | **Mass of Solution + Graduated Cylinder (g)** | **Mass of Cylinder (g)** | **Mass of Solution (g)** |
| --- | --- | --- | --- |
| 5 |  |  |  |
| 10 |  |  |  |
| 15 |  |  |  |
| 20 |  |  |  |
| 25 |  |  |  |

Insert graph from Data Table 5 here, as directed in Activity 4, step 4.

Density (slope) of Beverage:

Percentage of Sucrose in Beverage:

1. In Activity 4, the percentage of sucrose in a beverage was determined using density; however, many commercial beverages are made with high fructose corn syrup and not sucrose. Even beverages such as juice are not primarily sucrose.
2. Is the percentage concentration of sucrose determined in this activity accurate? Why or why not? If it is not, what could be done to make it more accurate?
3. Beyond sucrose type, what other confounding factors may exist in the determination of percentage concentration of sucrose? What were potential sources of error?